JUNE 3, 1996 VOLUME 13, NUMBER 23

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

START SWITCHING

But not without checking out our LAN switch Buyer's Guide. Page 41.

Is Microsoft's repository just another NT promise?

By Doug Barney

In May of 1994, Texas Instruments and Microsoft Corp. announced plans to build an open repository to ease the development of complex applications.

Now two years later, the Windows NT-based repository has yet to ship. And when it does finally appear later this year, it will not be open, or complete, a Microsoft official admitted.

Repository software, in short, offers a central place where users and programmers can store pieces of applications, such as software objects, class libraries, bits of business logic and even help files. A good repository allows teams of programmers — in some cases even power users — to assemble applications by pulling together components from across the network, greatly speeding the process of development.

By the end of the year, Microsoft will incorporate pieces of the repository in some of its development tools, such as Visual Basic.

"We are delivering this year repository technology, but not a full repository," said Jon Roskill, group product manager in Microsoft's Internet platform and tools division. The reposi-

See **Microsoft,** *page 73*

ONLINE

Get more info on Network World Fusion, including:

- A white paper detailing Microsoft's and TI's original repository plans
- An overview of repository-based development
- A page of object-oriented links

Select News+ then Front Page.

Network World Fusion

http://www.nwfusion.com

Internetworking advances

Cisco readies new routers; 3Com leads switch charge

By Jim Duffy

San Jose, Calif.

Cisco Systems, Inc. next week will step back from the switching frenzy to introduce a line of routers that offer backbone performance at mid-range prices.

The Cisco 7200 series will feature packet-processing rates and port density typical of high-end routers. But at $1,285 per port, they cost 40% less than their bigger brethren, according to Cisco documents obtained by *Network World.*

The routers' power and price should make them attractive for either regional site or backbone duty. "Basically, it's geared to fit that gap between the 4700 and the 7000," said an analyst who requested anonymity.

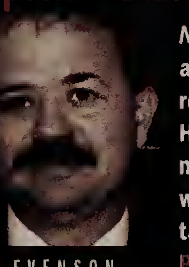
Cisco's 4700 line is typically used at regional sites, while the company's 7000 and higher end 7500 are used to anchor corporate backbones.

But upgrading from the mid-range to high-end routers had been a costly proposition until now, said Rolf McClellan, senior consultant at Strategic Networks Consulting, Inc. in Rockland, Mass. "These new routers make it a smoother transition between 4000 series and 7000 series routers," he said.

The 7200s are also designed to route virtual LAN traffic

See **Cisco,** *page 72*

Special Focus: Internetworking



EVENSON

NW examines how switches are changing the role of routers. While Children's Hospital's M.J. Evenson is moving to switches, routers will play a vital role containing his broadcasts. Page 22.

By Michael Cooney

If you can't stand the heat, stay out of the red-hot Ethernet switching kitchen.

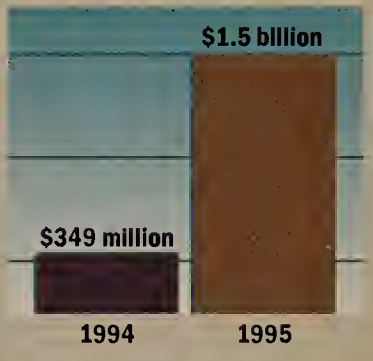
3Com Corp. will be one of many vendors with switching news this week when it announces a plan to reposition its switch families and help users migrate from one to another.

Hewlett-Packard Co., IBM and U.S. Robotics will also unveil new Ethernet and token-ring

See **Switch,** *page 72*

SWITCHING'S A HIT

It's no wonder vendors are falling all over themselves to roll out LAN switches given the way sales have been growing.



SOURCE: IDC, FRAMINGHAM, MASS.

Sun to feds: Keep your paws off Java

Secure version of Java tool kit is ready, but NSA approval is needed before it can ship.

By Ellen Messmer

San Francisco

A special secured version of Java is all dressed up with nowhere to ship.

Sun Microsystems, Inc. has added security features to Java Developers Toolkit (JDK) 1.1, which is intended to help users build applets that can be encrypted and authenticated.

The problem is that Sun's JavaSoft division cannot ship it because the National Security Agency (NSA) will not approve the technology for export. The rub? The agency still controls encryption the same way it does munitions.

Sun ardently wants Java to be accepted globally — not just domestically — and is now pleading with the NSA and the Commerce Department to let Java ship.

"All the technology is ready to ship, but we don't want to deliver a U.S.-only Java Developers Toolkit," said Alan Baratz, president of JavaSoft. "The new JDK will include all the APIs and a library of Java crypto."

Such security is crucial as Java has faced criticism over "hostile applets" wreaking havoc in computer systems (*NW,* May 20, page 1).

Because it is wrangling with the government over security for controlling applets, JavaSoft has no clear deadline for when it will get the product out the door. If talks break down, JavaSoft may have to issue a domestic version of the Java kit with security and an international version with watered-down security or none at all, Baratz stated. Sun officials

See **Java,** *page 15*

Sun's *Gosling just wants to export Java.*

NEWSPAPER $5.00

Access Network World Fusion using the number in yellow. See page 5 for details.

Nortel frees up bandwidth with ATM switch/PBX combo

By Tim Greene and David Rohde

In an effort to make its rural Macdonald agricultural campus feel less like a poor country cousin, Canada's McGill University has turned to ATM to close the distance between the remote site and the school's downtown Montreal campus.

Installation of Northern Telecom, Inc. Meridian Passport ATM modules, which were announced last week, enabled McGill to free up 1.3M bit/sec of bandwidth for data traffic on the two T-1 circuits used to link campus Meridian PBXs.

Most of that extra capacity came from the Passport's voice compression and silence suppression capabilities, which cut the bandwidth needed for voice traffic in half.

In addition, the ATM modules can reallocate bandwidth on the fly as demand from individual applications waxes and wanes. So when voice traffic virtually dies at night, nearly 3M bit/sec is available for data traffic, according to Gary Bernstein, associate director of telecommunications at McGill.

See **Nortel,** *page 73*

Microsoft
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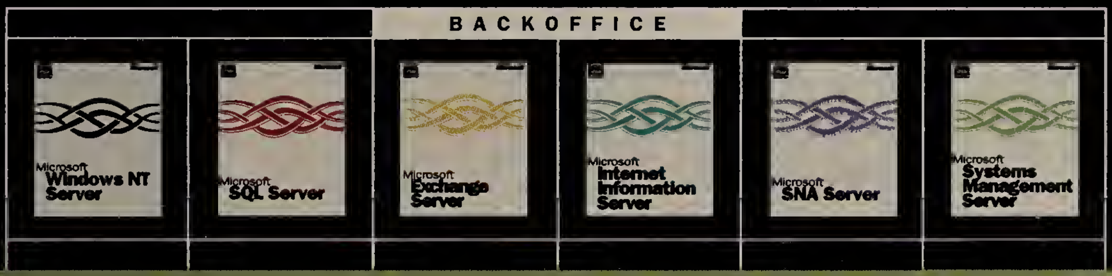
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This Week

News+

NetFlash

- Do you know what happened today in networking? Click on NetFlash — your daily networking news report, updated weekdays at 1:30 p.m. EST.

The Front Page

- **Fast Ethernet:** If it's time to make the move, download primers, Buyer's Guides and reviews.
- **Object-oriented development:** Download a white paper that explains Microsoft's and Texas Instruments' original plans for an object repository.
- **Java:** Take a sip or a gulp of Java-related resources, from primers to SDKs.

The Technical Sections

- **ATM:** Take a look at high-speed ATM test beds around the country, in WANs & Internetworking.
- **Wireless LANs:** See what makes them tick; download primers and comparisons of their advantages and drawbacks, in Local Networks.
- **Client/server E-mail:** Ease the transition to the next generation of messaging with a series of articles on everything from architecture to cutting costs, in Client/Server Applications.

NetRef

- Discuss enterprise network management with our panel of experts. We've posed a series of questions to them; see their replies and add your own.

this week's pick

The Applied Technologies Group has assembled detailed primers for a variety of communications and document management technologies, from ADSL to workflow. You can download the guides, which are in Adobe Portable Document Format, at http://www.techguide.com.

HOW TO GET ON TO NETWORK WORLD FUSION

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NetworkWorld Fusion

CONFERENCE PICK

HOT TOPIC

Agree with MacAskill and Le Baron on Layer 3 switching? Read their column, then add your thoughts.

Select Forum, Columnists then Net Results.

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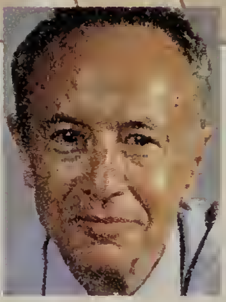

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NetworkWorld's *Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.*

News briefs, June 3, 1996

Ascend nabs NetStar

■ Ascend Communications, Inc. last week announced plans to buy NetStar, Inc. for about $300 million. Ascend will use NetStar's technology to develop high-speed IP switching and routing devices for Internet service providers (ISP), carrier points of presence and the Internet backbone itself. The NetStar gear, along with Ascend's line of access switches and routers, will reinforce the company's efforts to play a bigger role in carrier and ISP markets.

MAE-West meltdown

■ The primary and backup route servers in the MAE-West network access point (NAP) in San Jose, Calif., where some 40 Internet service providers' (ISP) backbones interconnect, simultaneously died last week, and outages lasted several days. The main result was a traffic slowdown, as communications reverted to less favored routes. Despite the fact that many ISPs rely on MAE-West, the NAP has never been declared officially operational by Merit, the organization that created the concept of route servers. Route servers minimize the number of deals individual ISPs must strike with one another to interconnect their networks.

MCI sees the light

■ MCI Communications Corp. last week announced it will begin one of the first public deployments of wavelength-division multiplexing (WDM) in its backbone between Washington, D.C. and Richmond, Va. MCI will deploy a technology called Quad WDM, which can quadruple the capacity of a single fiber-optic line by enabling it to support four light signals instead of one. WDM uses different colors of light to transmit data, voice and video. MCI said the technology will allow its backbone network to operate at 10G bit/sec, up from 2.5G bit/sec. The company said it expects WDM to let users deploy large-scale multimedia applications.

NT on the mainframe?

■ IBM really wants customers to look at their mainframes as servers. The company last week said it will work with Bristol Technology, Inc. to port Windows NT applications to MVS mainframes. Under terms of the agreement, Bristol's Wind/U development technology can be used in conjunction with IBM's OS/390 mainframe operating system to port applications written to Windows NT APIs onto the mainframe.

Secure blankets Border

■ Secure Computing Corp. last week announced plans to acquire Border Network Technologies, Inc. in a stock transaction valued at $190 million, a deal that unites two of the network security industry's leading players. Secure Computing, which already sells the Sidewinder Internet firewall, now adds Border's BorderWare Firewall Server to its product arsenal.

Compaq gung ho for Pentium Pro

■ As expected, Compaq Computer Corp. will officially unveil the ProLiant 5000 Pentium Pro-based server this week (*NW,* May 27, page 1), with prices starting at under $12,000. Compaq will also announce a series of partnerships with systems management software companies, but that announcement will not include Computer Associates, Inc. or Platinum Technologies, Inc. Agreements with those companies should be completed soon, said Jeff Arramouspe, Compaq's director of systems software marketing.

Novell takes a hit

■ Novell, Inc. last week announced a net loss of over $55 million for the company's second quarter ending in April, largely the result of a $225 million reduction in channel inventories. Novell made the reductions as part of a new distribution strategy announced in February. Sales for the quarter totaled $188 million, down from nearly $530 million for the second quarter in 1995. Separately, Novell said it will participate in the CableLabs Cable/Information Technology Convergence Forum, an organization dedicated to integrating cable and telecommunications technologies with networking.

Lotus closer to Notes-Web hybrid

Launches testing of new HTTP services that translate Notes data into HTML documents.

By Sari Kalin
and Barb Cole
Cambridge, Mass.

Lotus Development Corp. this week will begin beta-testing technology that enables Notes servers to act like World-Wide Web servers.

The long-awaited HyperText Transfer Protocol (HTTP) services for Lotus Notes, code-named Domino, translate Notes data into HTML on the fly, eliminating the need to store HTML versions of Notes documents in a separate server.

Users may retrieve Notes documents via Web browsers and have them appear as HTML documents, company officials said.

Lotus hopes the technology will help bring existing Notes customers onto the Web and attract new customers to the Notes platform.

The company also hopes the new offering will help put to rest speculation that the Web is going to kill groupware. According to Lotus, in addition to sophisticated application development tools, Notes brings to the Web such technologies as access controls for governing user IDs and passwords.

"Notes is a great platform for developing real, live business applications, and that's what people in the Internet and Web environments are screaming for," said Tim Dempsey, director of Notes product marketing at Lotus.

Lotus currently offers InterNotes Web Publisher, which runs on Web servers and publishes Notes data in HTML format. While InterNotes requires a separate Notes server and a Web server to deliver Web applications, Domino only requires one Notes server.

The InterNotes Web Publisher and Domino technologies will work together for now but eventually will be melded, Dempsey said.

One analyst gave high marks to Domino. "It shows you can bring some of the significant navigation concepts from Notes to the Web, such as expanding and collapsing of views," said David Marshak, vice president and senior consultant at Patricia Seybold Group, Inc. in Boston.

Lotus expects to release Domino in the next few months and to include the technology free with Notes, Dempsey said.

Separately, Lotus will announce this week at the Comdex/Spring trade show in Chicago a software product called Integrated Messaging for Lotus Notes, which links Notes or cc:Mail electronic messaging systems to voice mail systems.

The Notes-based software lets users access voice mail messages from their PCs and retrieve E-mail via a telephone. The software is compatible with voice mail systems from Intuity, and will soon work with systems from Siemens Rolm Communications, Inc., IBM and others.

Available now, the software is priced at $2,995 per server. It requires Notes, and supports Windows clients and OS/2 servers.

For more information, contact Lotus at (617) 577-8500.

Kalin is a correspondent with IDG News Service's Boston bureau.

Giving Web hooks to Notes

Product	What it does	Pricing	Availability
InterNotes Web Publisher	Publishes Notes documents, views and forms to the Web by translating them into HTML.	Free with Notes server	Now
Domino	Incorporates HTTP and HTML support directly into Notes, eliminating an HTML translation phase	Free with Notes server	In the next few months

ABEND

abend *(n)* 1: abnormal end to a computer process 2: the online fountain of 'Net wit and high-tech humor found on Network World Fusion (www.nwfusion.com).

Top 10 Internet service provider excuses for server problems

1. *Sunspots.*
2. *Ancient curse.*
3. *Drunken sysadmin left oil cap off engine.*
4. *Those damned poltergeists.*
5. *Obscure CDA clause mandates strict server curfew.*
6. *Gilligan!*
7. *PETA fanatics raided office, freed ants from farm.*
8. *Bloody glove planted in RAID by racist police department.*
9. *Cruel hand of fate.*
10. *Everything's always about you, isn't it?*

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IBM to make clustering pitch

By Ben Heskett

IBM will offer its take on PC server clustering in two weeks, spelling out plans to deliver more reliable client/server platforms to its customers.

The announcement, slated for PC Expo in New York later this month, is the latest in a string of clustering plans unveiled by the leading server vendors and based on a combination of Windows NT software and Intel Corp. processors. Hewlett-Packard Co. will announce its clustering intentions this week, while Compaq Computer Corp. and Digital Equipment Corp. have already aired their initiatives.

"What IBM has to do is stay in the horse race. They have to announce a clustering direction to stay with the other players," said Jerry Sheridan, an analyst with Dataquest, Inc., a San Jose, Calif.-based consultancy.

Similar plans

IBM's plans appear to be most similar to those of Digital and HP, sources said. All of these companies will offer their own clustering software layers on top of Windows NT and possibly adopt Tandem Computers, Inc.'s message-based ServerNet clustering technology.

IBM officials acknowledged that the company will air its clustering strategy later this month but declined to provide much detail. They did say, however, that the company will try to differentiate its approach by integrating its systems and network management tools with clustering.

Michael Coleman, IBM's general manager of PC servers, said TME 10 NetFinity, IBM's server and desktop management software, will be optimized to manage clustered Pentium- and Pentium Pro-based servers. This will allow an administrator to drill down to see one server amid a cluster of machines or see the entire cluster at work as a single system.

Though vendors are rapidly announcing clustering directions with their own middleware and hardware interconnects, the key to PC server clustering is Microsoft Corp. and the company's work on clustering extensions to Windows NT, dubbed Wolfpack.

The Wolfpack technology will eventually allow multiple servers to be clustered and act as a single system. A two-node version of Wolfpack is expected by year-end. Multiple-node extensions are due in 1997.

Servers roll out

In related news, HP rolled out its line of Pentium Pro-based servers and announced its clustering plans last week, based around a middleware layer taken from the Unix side of the company called MC/ServiceGuard (NW, Feb. 26, page 9).

Separately, Compaq will formally announce its Pentium Pro server line this week (NW, May 27, page 1) and Digital will unveil its Pentium Pro-based Prioris server at Comdex/Spring in Chicago. Digital's server will be available in multiple configurations based on 166-MHz and 200-MHz Pentium Pro microprocessors. IBM also said last week that its Pentium Pro-based model, the PC Server 704, is now shipping. ■

HP SERVER SUMMARY

Product	Description	Price	Availability
NetServer LX Pro	High-end server based on up to four 166-MHz and 200-MHz Pentium Pro processors; features six PCI and four EISA slots and up to 2 Gbytes of memory.	Starts at $14,340	Q2 or Q3, depending on configuration
NetServer LH Plus	Pentium-based mid-range server based on one or two 133-MHz or 166-MHz Pentium processors. Features four PCI, four ISA and one shared PCI/EISA slots, as well as up to 512M bytes of memory. Can be upgraded to Pentium Pro.	Starting at $5,800	Q2 or Q3, depending on configuration

Broadband services

NEC carrier gear could help bring ADSL to the masses

By Tim Greene

Herndon, Va.

NEC America, Inc. is ready to deliver a set of products that will enable carriers to offer ATM-based services over standard phone lines.

The company later this month will demonstrate at SuperComm '96 in Dallas just how carriers can use the gear to deliver broadband video and LAN access, as well as analog voice services using Asymmetric Digital Subscriber Line (ADSL) technology.

While carriers have been testing ADSL and its variants in limited trials for months with prototype modems, this will be the first public demonstration of equipment designed to support the high traffic volume that a full-service offering would generate.

The demonstration will also show how a user could receive video signals and connect to a remote LAN, Internet or intranet service and make phone calls, all on a regular phone line.

The video and data signals would ride over ADSL as Asynchronous Transfer Mode traffic generated by a set-top box at the customer site (see graphic). Converting traffic into cells at the customer site will enable carrier switches to handle traffic more efficiently than if they had to deal with multiple traffic types.

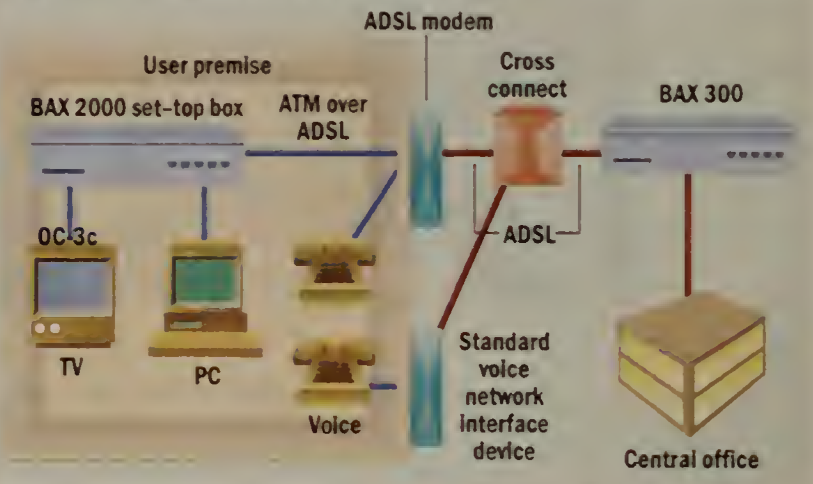
Companies planning to offer ADSL services include US WEST, Inc.'s Interprise group. While not discussing NEC's architecture, Joseph Glynn, Interprise director of internetworking design, described two network options compatible with NEC's outline. One scenario would concentrate ADSL traffic at the end of the copper loop, either at a remote subscriber line multiplexer or central office. Traffic would be converted to cells at those points and put on the network's ATM backbone. In the subscriber line multiplexer case, the concentrator would also convert the traffic to cells and send it back to the central office.

The second scenario calls for ATM to the customer premise, which would require an ADSL modem at the customer site with the ability to convert traffic to ATM cells. But this option has one major mark against it, Glynn said. About 15% of ATM traffic is eaten up by addressing and other coding.

The new NEC gear supports some of both scenarios. NEC has a set-top box that generates ATM cells and a remote concentrator that aggregates traffic to a central office but that does not generate cells. NEC has a second central office concentrator that aggregates traffic from several remote concentrators. ■

NEC pushes ATM to the edge

NEC's vision of high bandwidth to remote sites includes a set-top box, the BAX-2000, which generates ATM traffic at the user premise and sends it with a voice channel over standard phone lines via ADSL. This traffic is then aggregated onto a fiber connection by NEC's BAX 300 device, then sent to the central office.



From ADSL to RADSL

The alphabet soup of broadband service acronyms just got a little thicker with the introduction of AT&T Paradyne's Rate Adaptive Digital Subscriber Line (RADSL) technology, due in August.

A variant of Asymmetric Digital Subscriber Line (ADSL), which delivers broadband services over standard copper phone lines, RADSL will allow production of DSL modems that adjust bandwidth depending on the condition of the line being served.

A standard ADSL connection delivers 6M bit/sec downstream and 384K bit/sec upstream over 12,000 feet of 24-gauge wire, leaving out users who live farther from the provisioning central office. With RADSL, the carrier could offer less bandwidth over a longer distance, according to Clete Gardenhour, AT&T Paradyne's director of advanced transmission technologies.

Modems based on the RADSL chips could deliver as little as 600K bit/sec downstream over 21,300 feet and 128K bit/sec upstream over 25,000 feet, Gardenhour said.

— Tim Greene

CORRECTION

The deadline for Certified Novell Engineer (CNE) recertification was listed incorrectly on page 27 in the May 27 issue. CNEs must register for the qualifying exam by June 30 and take the exam by Aug. 31.

Taking aim at ATM

Asynchronous Transfer Mode appears to be at a crossroads, facing serious challenges from several emerging technologies at the desktop and backbone levels. Network World Fusion has convened a panel of experts, including Joe Skorupa of Fore Systems and industry veteran Bobby Johnson, to debate the future of ATM. Join this online conference beginning today at http://www.nwfusion.com.

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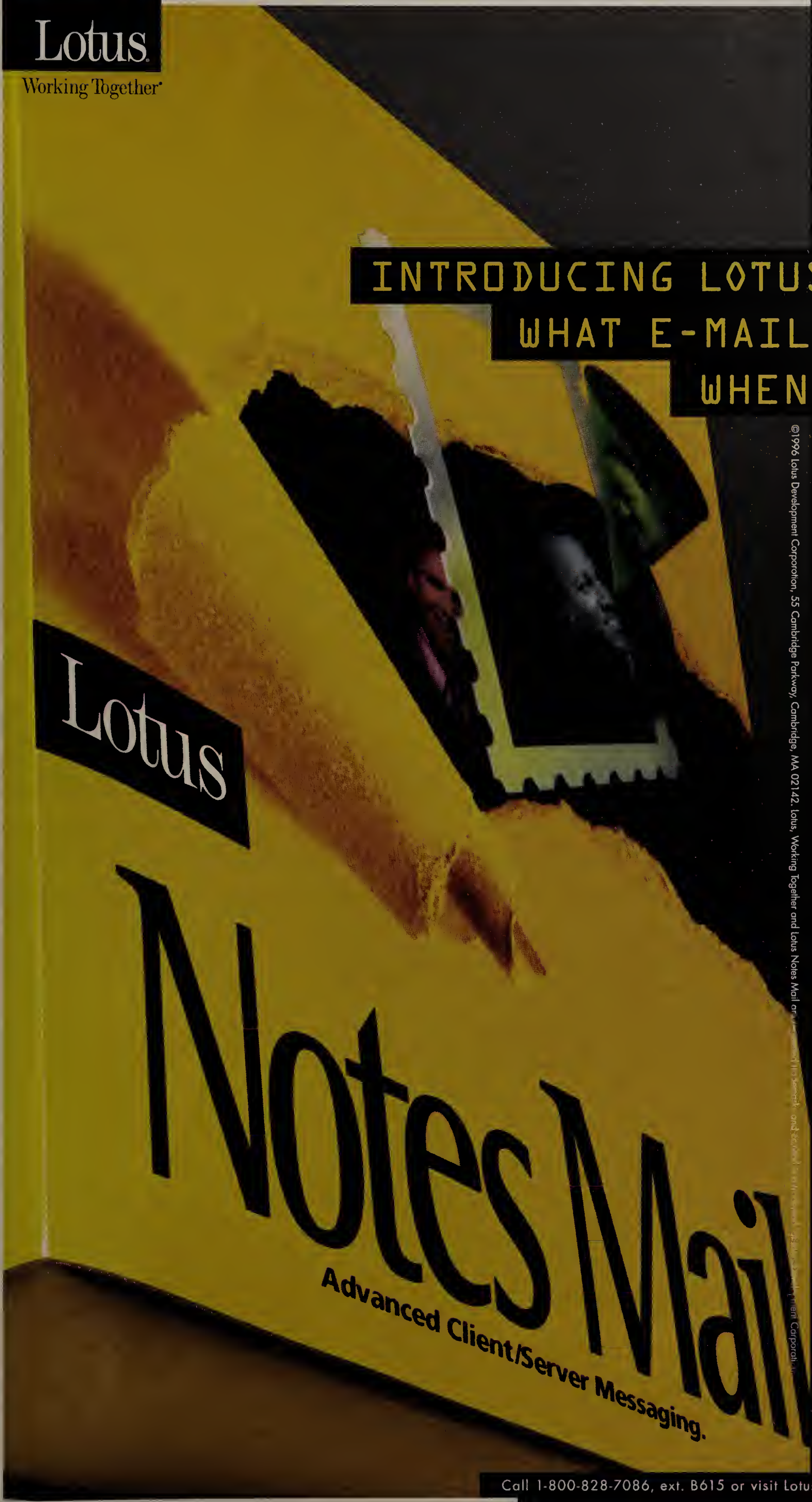

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Carrier Internet access options mushroom

AT&T adds frame access to 'Net services; LCI enters biz.

By Joanie Wexler

New Internet access options sprouted up last week from AT&T and up-and-comer LCI International, Inc.

AT&T added frame relay as a way to tap its WorldNet Managed Internet Service (MIS), the dedicated-line 'Net connectivity service it launched for business customers in September. And LCI made its debut in the 'Net access arena with LCI@ccess, a vanilla private-line access service with speeds ranging from 56K bit/sec to T-1 and priced from $925 to $2,225 a month.

The moves reflect common thinking among carriers of late that offering users all the services they could possibly want from one provider will be the key to garnering market share.

Frame access to the Internet, for example, accommodates existing frame relay customers. The AT&T option allows most frame customers to piggyback their Internet traffic onto existing routers, local access lines and frame relay ports. Provided they have some extra capacity on their local access lines and ports — which analysts said most do — users only have to pay for an extra permanent virtual circuit (PVC) to the Internet from each connected site (see graphic).

In AT&T's case, users also pay a small gateway service charge. But frame access is always less expensive than dedicated-line alternatives from WorldNet, said Rob Marschall, product manager for WorldNet MIS.

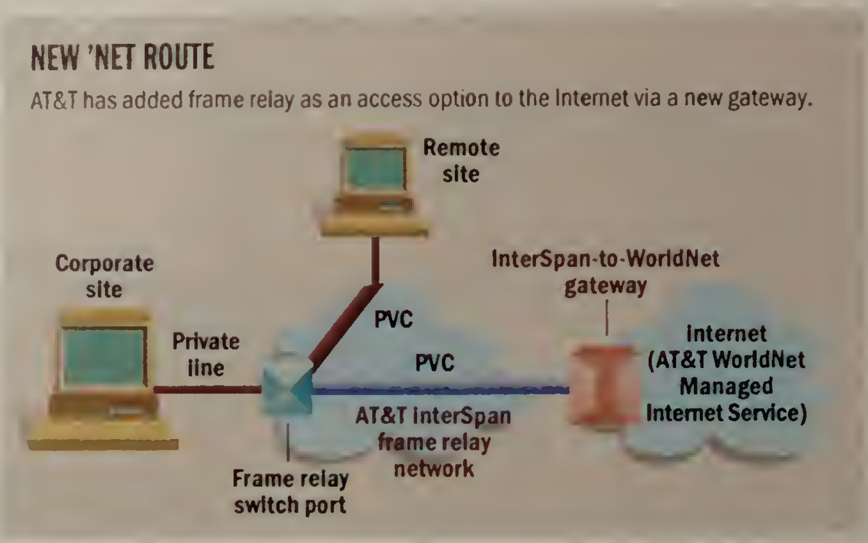
For example, the highest access speed offered by AT&T across its InterSpan frame relay network is 1,024K bit/sec and it costs $1,795 per month. By comparison, private-line access from AT&T at the same speed is $1,895, he said.

A possible drawback for some companies is that melding corporate enterprise nets and the Internet via a gateway raises security concerns, said Christine Heckart, director of broadband at TeleChoice, Inc., a Verona, N.J.-based consulting firm.

"If you're paranoid, you probably wouldn't choose frame for 'Net access," she said. But users can save the cost of an extra router at every site — about $2,500 each — and extra local loop charges that start at about $150 per month per site for 56K bit/sec access, she said.

NEW 'NET ROUTE

AT&T has added frame relay as an access option to the Internet via a new gateway.


Remote site
Corporate site
InterSpan-to-WorldNet gateway
PVC
Private line
PVC
Internet (AT&T WorldNet Managed Internet Service)
AT&T InterSpan frame relay network
Frame relay switch port

To use AT&T's frame access option, network managers order the service and then create an entry in their router that specifies the new PVC where Internet traffic should be routed, explained Bruce Tanzi, AT&T InterSpan product manager. Desktop users simply select a URL with their browser, and their traffic is routed either to a corporate intranet site or to the Internet, he explained.

For its part, LCI has entered the Internet access market amid predictions of an imminent Internet service provider (ISP) shakeout.

But analysts said the LCI move is more to appease existing customers and to avoid getting kicked off user short lists than to try competing wholeheartedly as an ISP.

"This is a customer retention strategy, particularly in light of the recent UUNET Technologies, Inc.-MFS Communications Co. merger," said Steve Franco, program manager for interactive communications research at The Yankee Group consulting firm in Boston. "If LCI exposes a customer to UUNET [for Internet access], the customer might be hired away for other telecom services [from MFS]." ■

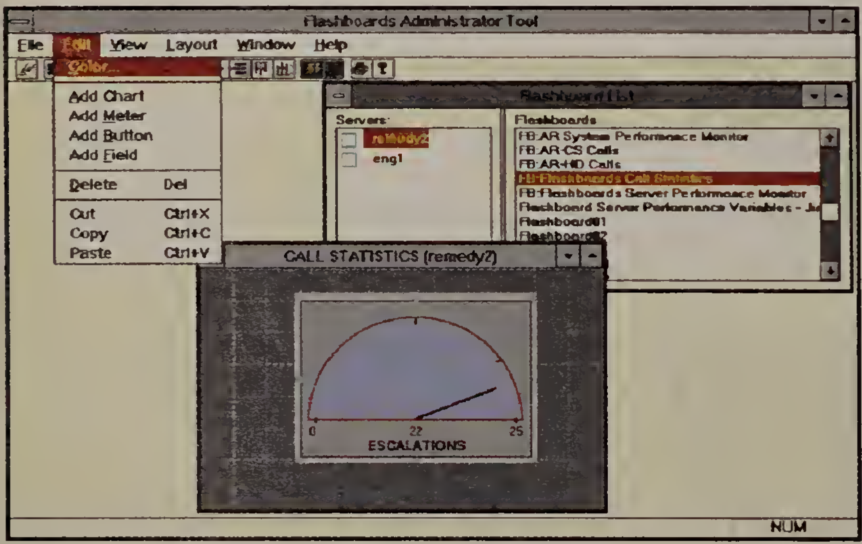
No stopping NT

Remedy pumps up ARS for NT

By Jim Duffy

Beginning this week, Remedy Corp. will allow more users to hang off a Windows NT help desk server.

The company is rolling out a multithreaded upgrade to its Action Request System (ARS) for Windows NT that distributes and balances help desk workload across multiple processes on a single server.



Flashboards *for Windows NT administrator tool.*

Remedy already supports this feature on its Unix incarnation of ARS, meaning that more than 500 administrators can use one ARS server instead of only 25 to 100.

Remedy will also unveil a Windows NT version of its Flashboards application, which displays graphical, dashboard-like system performance metrics. Flashboards is also currently available for various flavors of Unix.

Remedy is attempting to package ARS and Flashboards as an NT-based help desk offering that scales to enterprise-level duty.

Yet the Multiserver Option feature is more of a performance booster than a scalability enabler, analysts said. And the NT version of ARS still lacks some key features of the Unix version.

"There are two features that are still not on the NT version that they offer with their Unix product: One is the full-text search option, and the other is Distributed Server Option," which allows users to link ARS servers across a company so help desks based on the Remedy software can scale to manage larger networks, said Bill Keyworth, research director for network and systems management at Gartner Group, Inc. of Stamford, Conn.

"Those are two additional steps that are required in order to make this as complete a package as they currently have on Unix," he said.

But the Multiserver Option is just fine with Compaq Computer Corp. The Houston-based PC and server maker wants to keep its help desk server centralized but add more concurrent users.

"We run between 80 and 100 simultaneous users right now on our Unix [ARS servers] and we want to move to the NT platform," said Fred Jones, vice president of information systems at Compaq.

"We think that this product will scale to that size reasonably and easily. We're going to be growing so we expect that to even be twice that [size]," he said. Remedy plans to add the full-text search and Distributed Server Option features to ARS for NT later this year.

Flashboards for NT merely moves the help desk system performance metrics application from Unix over to NT. Users can administer Flashboards for NT from the Windows Admin Tools feature on a Windows workstation. This enables administrators to cut, copy and paste Flashboard charts, meters and fields.

ARS for NT bundled with the Multiserver Option starts at $9,500; Flashboards for NT starts at $5,000. Both products will ship this month.

©Remedy: (415) 903-5200.

IBM manages to simplify Tivoli pricing

By Michael Cooney

Austin, Texas

Tivoli Systems, Inc. last week unveiled a flat-charge pricing scheme it hopes will end the confusing way it charges for its distributed management software.

The company said it will charge $2,000 per software function and $75 per client for its new Tivoli Management Environment/10 software. The idea behind the pricing scheme, called 10/Flex, is that users can easily calculate software prices by multiplying the number of systems by the functions required, said Scott Harmon, vice president of marketing for Tivoli. "As a result, customers can configure management components independent of the price they pay, enabling them to reconfigure their management environment as it evolves," he said.

Tivoli Management Environment/10 is the new cross-platform systems and network management package that melds existing Tivoli functionality with a good portion of IBM's SystemView offerings. The result is a single, mainframe-to-desktop package that the companies claim will simplify the management of large distributed enterprise environments.

IBM acquired Tivoli in March for $743 million, and this announcement is part of the ongoing integration of the two firms (*NW,* March 25, page 14).

Harmon said the pricing scheme also helps users that have hundreds or thousands of dispersed servers that are undergoing almost constant hardware and software upgrades simply because there is no additional incremental charge for them.

The 10/Flex pricing scheme only involves the eight components of today's Tivoli Management Environment 3.0 family and the 50 or so IBM SystemView products for managing distributed networks. It does not change the pricing of IBM's mainframe-based NetView or NetView for OS/2 products, Harmon said. The mainframe products will stay priced according to machine size.

The new pricing takes effect in June for new and existing users.

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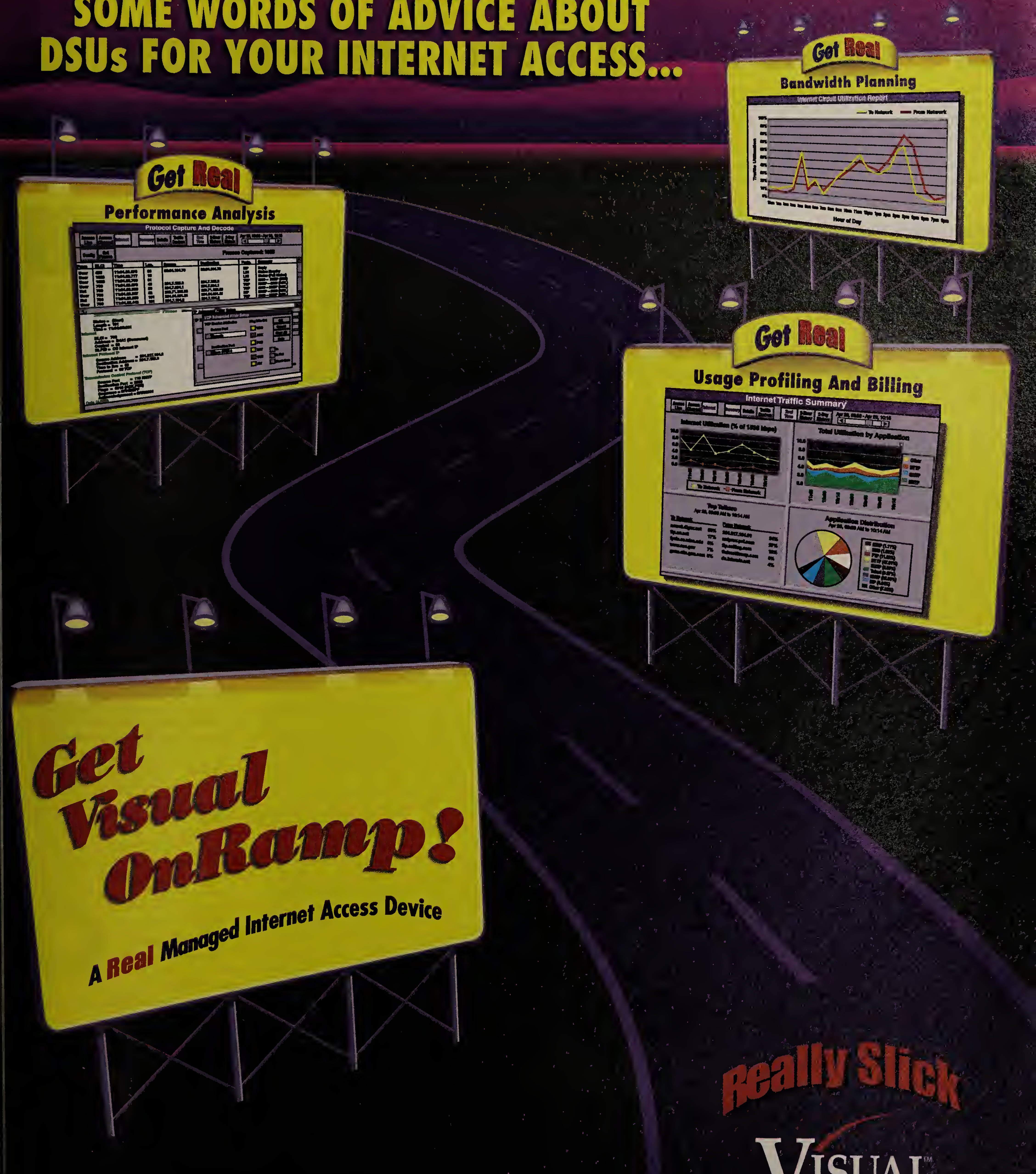
SOME WORDS OF ADVICE ABOUT DSUs FOR YOUR INTERNET ACCESS...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Sun's Java gets OS to call its own

By Elinor Mills and Ellen Messmer
San Francisco

Sun Microsystems, Inc. opened its JavaOne developer's conference here today by announcing JavaOS and a host of licensees that will offer the Java operating system on a range of systems within a year.

Touting the operating system as the smallest and fastest to run the Java object-oriented programming environment, executives gave a demonstration of a JavaOS-based prototype terminal running on a MicroSPARC II processor.

JavaOS can run with as little as 512K bytes of read-only memory and 128K bytes of RAM, said Alan Baratz, president of JavaSoft, a Sun subsidiary.

Licensees will tap JavaOS in the following products:

- ■ In forthcoming Oracle Corp. network computers.
- ■ In Acer, Inc. consumer devices.
- ■ In Toshiba Corp. Internet terminals.
- ■ In Nokia Corp. telephones.

Despite the similarity of functions between Netscape Communications Corp.'s Navigator and Sun's duo of JavaOS and HotJava browser, JavaSoft executives said Navigator will remain the top browser. "We're not going head-to-head in the browser-on-the-desktop space," said Jon Kannegaard, vice president of products at JavaSoft.

Sun shines on chips

In related news, a half-dozen semiconductor and office equipment manufacturers threw their weight behind new Java chip technology developed by Sun, vowing to "Java-enable" everything from the fax machine to cellular phones.

The companies, including giants such as Mitsubishi Electric America and NEC Corp. (see chart), announced that they will either license Sun's Java chip technology to sell chips themselves or include the Java chip in office equipment or microcontrollers.

Sun has embedded the Java virtual machine on three types of chips. Two of these chipsets — UltraJava and MicroJava — are intended for PCs and multimedia, according to Sun Microelectronics President Chet Silverstri. The new licensing announcement concerns the third Java chipset type — called PicoJava — which is intended for equipment such as handheld computers or faxes.

Although PicoJava-based equipment is a year off at least, some of the manufacturers shared their vision of what the picochip could do. According to Y.B. Rha, Samsung Group president and chief executive officer, Java will let cellular phones run programs from a remote computer.

And Beau Vrolyk, a vice president and general manager of workgroup products for Xerox Corp., said multifunction fax machines could also be used to create HTML pages that could be sent out to Web site.

Mills is a correspondent with the IDG News Service in San Mateo, Calif.

Application integration

SunSoft releases Java tool kit for management applications

By Jim Duffy
Mountain View, Calif.

SunSoft, Inc. last week may have unveiled the solution to a problem that's been vexing network managers for many years now — application integration.

The company introduced the Solstice Workshop, a software development tool kit that allows users to write Java-based management applications for the Internet and intranets. Because it supports Java, which is purported to be platform-independent, Solstice Workshop promises to deliver the application integration that has been lacking in the leading enterprise management systems.

"One of my beliefs is things like the Web are going to be the glue, the integration point, rather than the [management] platforms," said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo.

"There's two questions: Can they deliver the infrastructure when they say they will, and can they get enough people to use it," he said.

Several vendors have already lined up in support of the Solstice Workshop (see graphic). Some who are conspicuously absent, though, are management platform leader Hewlett-Packard Co., and browser heavyweights Netscape Communications Corp. and Microsoft Corp.

HP sees potential for Java in network and systems management, but is still considering options, said Gordon MacKinney, HP OpenView program manager.

SunSoft, though, attaches no significance to their absence.

"It's just a matter of who is farther along in their evaluation process," said Brian Biles, SunSoft's director of Solstice product marketing. "The people that [we] were trying to get the most input from was management application authors."

Yet McConnell believes the support of Netscape and Microsoft would be a boost.

"For longer term viability, the support of the browser vendors would certainly not hurt," he said. "But the real problem is going to be downstream if they have to keep updating their APIs every time the browser vendors make a change."

Java achievers

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- Cisco
- C A
- Compuware
- Landmark Technologies
- Legato Systems
- Novell
- OpenVision
- Platinum
- Tivoli
- 3Com

Solstice Workshop combines the object-oriented Java Workshop applet development environment with a new API called Java Management API and a database.

Another component of the Solstice Workshop is the Browser User Interface, which includes a style guide with a Web-based model for how to build tightly integrated management applets.

Solstice Workshop will be available in the fall, when pricing will be announced.

©SunSoft: (415) 960-3200.

THIRD-PARTY ACTIVITY

Novell throws more weight behind Java

Novell, Inc. last week backed up its earlier pledge to support Java by announcing a tool kit that will enable developers to build Java applications that run on NetWare servers.

The NetWare Software Development Kit for the Java Platform will also let developers build Java applications that exploit Novell technologies such as Novell Directory Services. Novell introduced the offering at the JavaOne developer's conference in San Francisco.

Novell is also working with Sun's JavaSoft division to extend Java's class libraries to include naming, directory and other services.

Novell originally licensed Java technology from Sun Microsystems, Inc. in March.

The tool kit will be available in a beta version for NetWare 4.1 this fall.

Contact Novell at (800) 733-9673.

Corel says Java 'perfectly' fine

Java may not be just for tiny applets after all.

Corel Corp. last week announced an ambitious plan to ship a full Java-based office software suite that includes Corel Word Perfect, Corel Quattro Pro and other applications by the beginning of next year.

The Java-based Integrated Office Suite can be set up to reside on any Web server, and any user with a Java-powered browser and access to the server will be able to download component applets, said Michael Cowpland, Corel's president and chief executive officer.

Corel's native-mode Java suite of applets is expected to cost about $100 per seat — the same as the non-Java bundled software today licensed by Corel. But the Corel Java office suite, expected to consume less desktop memory, will be tailored to run on the new generation of low-cost Java-powered network computers touted as substitutes for PCs.

Cowpland said Corel's embrace of the platform-independent Java programming language will free software developers from the tyranny of Microsoft's control over software design. "With Java, Microsoft isn't able to control the agenda as to when versions come out," he said.

Contact Corel at (613) 728-8200.

—Ellen Messmer

Lucent calls on Java

Telecommunications company Lucent Technologies, Inc. last week teamed up with Sun Microsystems, Inc. to develop a specification for integrating Internet and telephony technology via Java.

The Java telephony object specification will allow software developers to write applications that manage voice and data connections. Such applications will be able to integrate World-Wide Web applications with existing call-control software, including applications compatible with Novell, Inc.'s Telephony Services Application Programming Interface and Microsoft Corp.'s Telephony API.

Applications based on the specification will let users make analog voice calls and manage conference calls while browsing the Internet. "The new Java specification will allow analog voice to enter the Internet," said Jerry Prestinario, vice president of computer telephony applications at Lucent.

The specification is in its infancy and will probably be used mostly by call centers to interact with callers from a company's Web site, he said. For example, by downloading a Java applet, users could establish and manage conference calls from their computers, such as adding or deleting callers.

Contact Lucent at (908) 582-8500.

—Kristi Essick
IDG News correspondent

Java

Continued from page 1

hope to get some version out this summer.

JavaOne topics abound

The problems that Sun is facing with government spymasters were alluded to only briefly during the boisterous and upbeat JavaOne conference here, which was attended by thousands of software developers from around the world. Instead, more arcane matters of object-oriented programming took center stage.

JavaSoft unveiled the Java Beans project, a long-term effort to create a set of component APIs written in Java that would let applets work with component architectures such as HTML, Component Object Model, OpenDoc and Live Connect.

Borland, IBM, Lotus Development Corp., Netscape Communications Corp., Oracle Corp. and Symantec Corp. all said they would support the cross-platform development effort, which is not likely to yield fruit until mid-1997. Microsoft was noticeably missing from the list of endorsers.

Sun will also be adding so-called servlets to Java that will support the dynamic loading of software onto the server from the Java client. Currently, Java clients can only download server applets. Unfortunately, new tools such as servlets are dependent upon the release of the developer kit.

> *"Security is the No. 1 concern of ours, of protecting the integrity of the transaction path," said John MacIllwane, director of information technology at Lombard Institutional Brokerage.*

The prospect of Java servlets being loaded into Web servers to interact with other servlets makes the need for a security scheme to control them more acute.

Servlets should only be allowed to interact with other servlets if they are digitally signed so the applet's originator can be identified, said staff engineer Marianne Mueller.

The U.S. government is unlikely to block export of digital signatures, but JavaSoft's entire suite of crypto APIs, of which signing is one, is under scrutiny by the NSA because some of the APIs enable plug-and-play encryption.

"The hope is we'll get export approval for exportable applications with this API," said Benjamin Renaud, a JavaSoft staff engineer.

Don't forget security

Though security was not discussed much at JavaOne, the frustration at Sun over government export restrictions spilled over occasionally during the presentations made by James Gosling, Java's inventor and Sun vice president.

"The technology is easy," said Gosling, who gave the keynote address to a hall overflowing with developer types.

"Getting the Congress and the NSA to be happy is where the challenge is," he said. "Everyone should write a letter to their Congressman. What the NSA is doing is sad and silly."

Gosling later said adding encryption to Java was "fraught with legal peril."

"The question is, how do you do it without being arrested for being arms trafficers," Gosling asked.

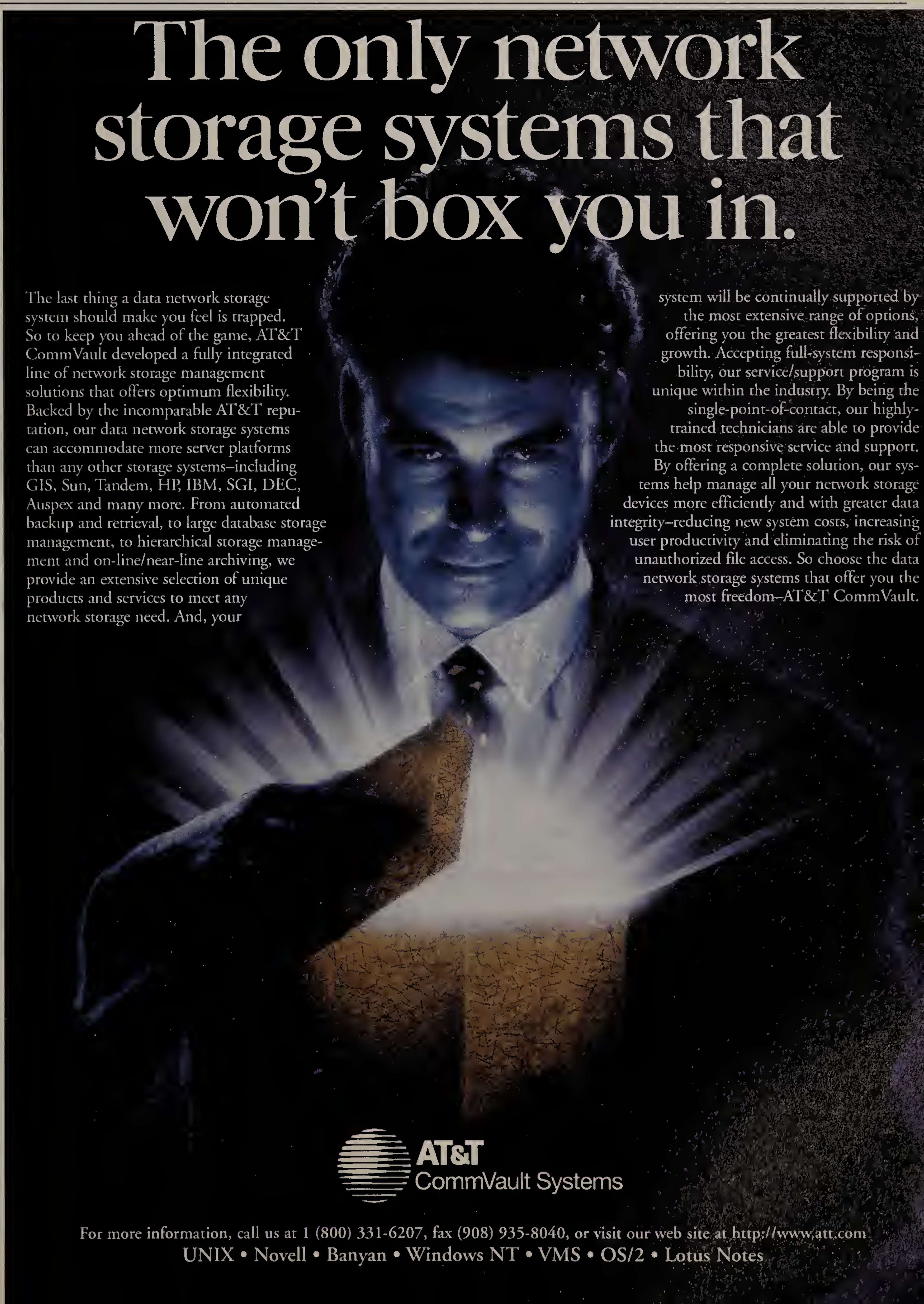
Corporations beginning to use Java say it is critical that the security features be added.

"Security is the No. 1 concern of ours, of protecting the integrity of the transaction path," said John MacIllwane, director of information technology at San Francisco-based Lombard Institutional Brokerage.

Lombard provides stock information to clients who can place trades over the Web. A Java applet now lets Lombard provide more dynamic stock analysis information to clients with Java-compatible browsers.

But security concerns have compelled Lombard to run the Java applet on an isolated machine and limit its use to real-time stock quotes, not actual trades. MacIllwane said.

Lomabard would keep a go-slow approach to Java until a comprehensive security strategy was in place. ■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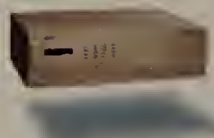

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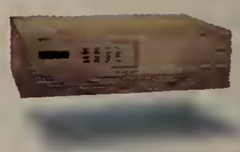

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WANs & Internetworking

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Briefs

■ **Motorola, Inc.'s** *Messaging, Information and Media Sector last week formed the Platform Software Division, a new business charged with developing a common software platform that includes a* **wireless operating system,** *development tools and applications. The products will run across paging, cellular, wireless data and two-way radio communications networks and will be made available to the industry at large, the company said. Products are expected later this year.*

■ **Farallon Communications, Inc.** *has released new firmware for its* **ISDN routers** *and dropped the price of the devices by 25%. Version 1.2 of Netopia Firmware reportedly features easier administration of Netopia routers. The firmware also makes the Netopia line interoperable with 95% of the installed base of central-site equipment at Internet service provider points-of-presence, Farallon said. Also, the previous $995-to-$1,350 price range of Netopia Internet Routers has dropped to between $749 and $1,195.*

Farallon: (510) 814-5000.

■ **Proteon, Inc.** *has licensed a component of its OpenRoute software technology to Mosaic Information Technologies, Inc. of New York. Mosaic designs, manufactures and markets a variety of* **videoconferencing** *systems in desktop, group and large room configurations. OpenRoute's object-oriented development environment will allow Mosaic to develop interfaces across DOS, Windows and Unix systems, Proteon said.*

■ **Ericsson** *last week said it has signed a deal to provide the first* **cellular** *system in Panama. BSC de Panama SA, partly owned by BellSouth Corp., placed an order for $12 million of time-division multiple access infrastructure equipment from Ericcson. Services are to be up this month in Panama City, with services in Colon to follow in September.*

Group straps in users for ATM test rides

By Michael Cooney

Research Triangle Park, N.C.

Building on its expertise in setting up large-scale, wide-area ATM backbones, the research arm of North Carolina's MCNC is offering an ATM test-bed facility for users.

The test bed, called VitalNet, is made up of a fiber-optic, OC-48 backbone and lets users test everything about Asynchronous Transfer Mode products from flow control, throughput and quality of service capabilities to network management applications — all in a real-world production ATM environment.

NetEdge's *Pfeiffer*

"Existing labs and test beds cater to the vendor community and are mostly closed to the user community: VitalNet is for users," said Bill Pfeiffer, executive director for the Advanced Information Technology Application Center and chairman of the internetworking firm NetEdge, Inc.

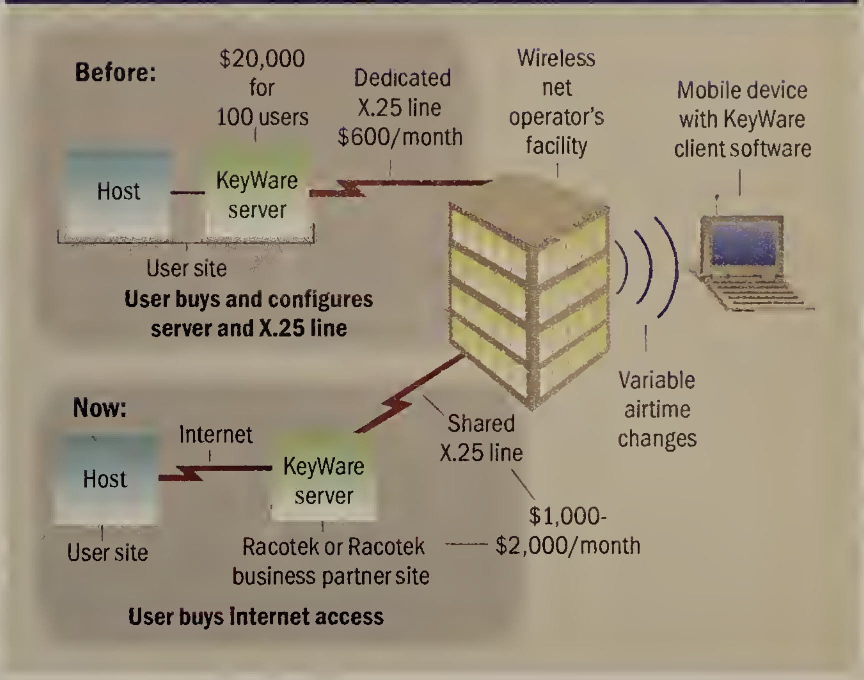
With, in some cases, million-dollar networking equipment purchases staring at them, users can answer questions about interoperability and performance, and gauge the impact on existing systems before signing on the dotted line, Pfeiffer said.

MCNC, previously known as the Microelectronics Center of North Carolina, runs VitalNet and is one of the main architects of the North Carolina Information Highway project, a statewide ATM network. The network links a variety of universities and companies via OC-3 links to an OC-48 backbone. Time Warner Communications provides the fiber-optic backbone.

The idea is for VitalNet to be a proving ground for ATM software and hardware in a true production environment rather than a lab, said Nancy Agosta,

See **ATM,** ***page 20***

Headache relief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User site
Racotek or Racotek business partner site
User buys Internet access

Mobile data networks

Racotek beefs up middleware

By Joanie Wexler

Minneapolis

Racotek, Inc. last week enhanced its KeyWare mobile middleware product in an attempt to simplify application development, network management and access to wireless data networks.

The company is hoping to overcome some of the obstacles that have held back wireless network deployment. KeyWare's new features include:

■ KeyWare Services Remote Access, which reportedly alleviates headaches and some of the expense associated with buying and configuring KeyWare servers and X.25 links.

Today, the user hosts the KeyWare server — a hardware/software system that interfaces user applications to multiple wireless and wired networks — and buys X.25 links to the net operators' facilities. With the new plan, Racotek or a Racotek business partner will house the KeyWare server on their premises, and the user's host can access it over the Internet (see graphic).

■ Simple Network Management Protocol agent software for managing mobile nodes from SNMP-compatible enterprise net management systems. Historically, wireless networks have been virtually unmanageable, "which is why a lot of companies won't do wireless," noted Iain Gillott, manager of wireless communications at consulting firm IDC/LINK in Austin, Texas.

■ KeyScript drag-and-drop visual development environment. The software contains parameters for existing client devices, such as screen sizes for Norand Corp. and Telxon Corp. handheld scanners, according

See **Racotek,** ***page 20***

Platinum to link schedules

By Jim Duffy

Oakbrook Terrace, Ill.

Platinum Technology, Inc. last week unveiled software designed to help users coordinate tasks among different applications, such as downloading data, launching reports, and initiating distribution and backup.

Platinum rolled out AutoSys/Adapters, software that integrates the company's AutoSys job scheduling package with Oracle Corp., SAP AG and PeopleSoft, Inc. applications. AutoSys manages jobs and cross-application dependencies through a single, centralized console.

AutoSys/Adapters run on Unix and Windows NT clients and servers, as well as IBM MVS/VSE mainframes. They are intended to enable users to manage the disparate job scheduling functions of different applications as an integrated whole through the AutoSys package.

"We think the next battleground is the integration wars," said Chip McAvoy, Platinum lab manager. "[Applications] have a little bit of job scheduling, but they don't do it as good as we do."

On Schedule

Platinum's AutoSys/Adapters work with the following job schedulers:

- ▶ Oracle Concurrent Manager
- ▶ SAP Scheduler
- ▶ PeopleSoft Process Scheduler

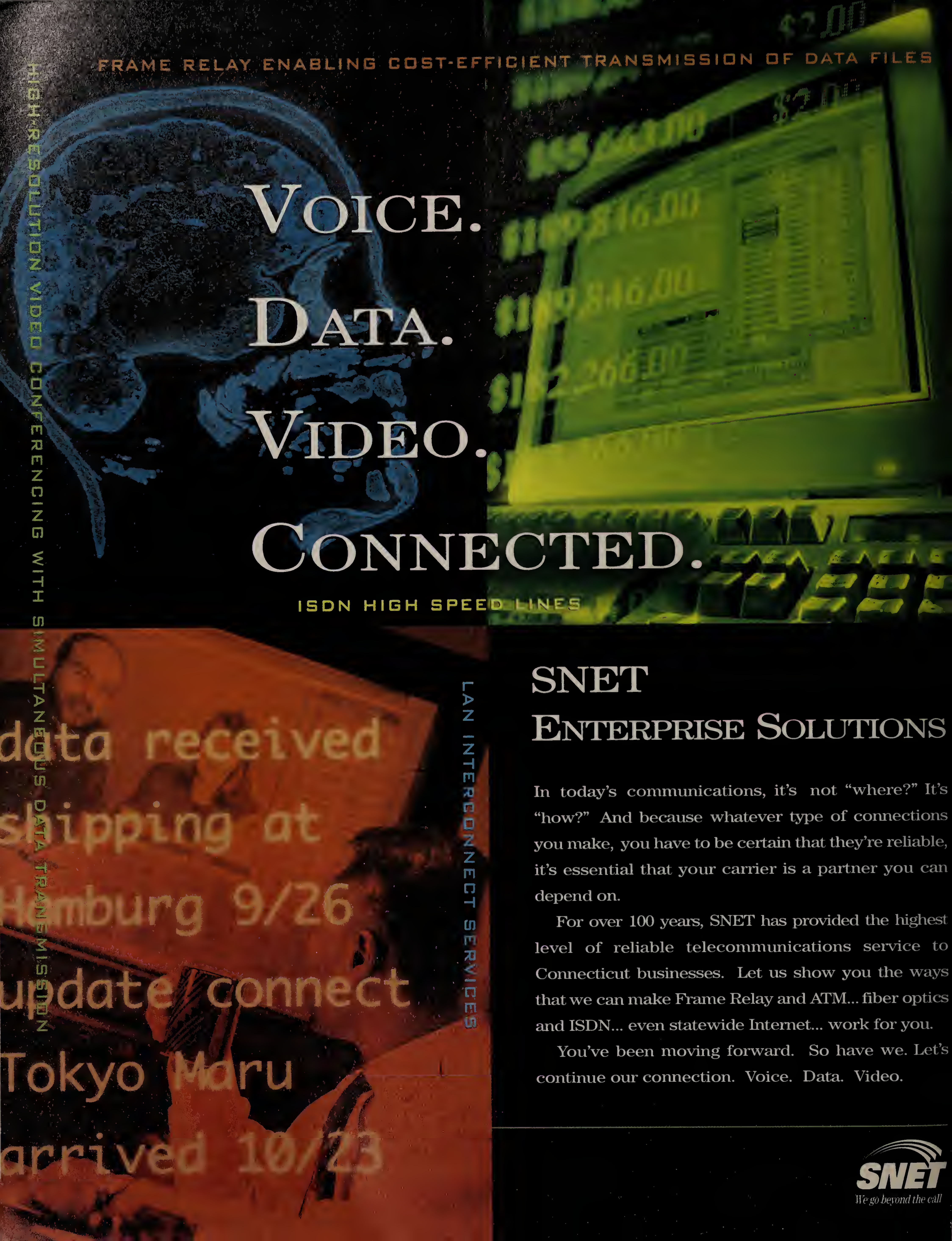
The alternative to the AutoSys/Adapters approach would be to use several application-specific job schedulers and attempt to customize task coordination among them. But with the adapters, for example, users can download information from a mainframe, subsequently launch a financial report job, upload it into an Oracle database, back up the data and then distribute the results, all through a single AutoSys interface.

Yet analysts said the AutoSys approach is still cumbersome.

"I hate to label it a kludge, but it's just a temporary sort of fix at the moment because it really isn't a true cross-platform solution. It's just an adapter that enables one application to talk to the other," said Paul Mason, director of enterprise systems management research at International Data Corp. in Framingham, Mass.

Indeed, users with a mixed environment of Oracle, SAP R/3 and PeopleSoft applications need to run all three adapters in order to integrate job scheduling under AutoSys. Mason said some of Platinum's competitors, such as Cybermation, Inc. and New Dimension Software, cur-

See **Platinum,** ***page 20***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SNET
We go beyond the call

Firm boosts fractional T-3 services

New OnStream multiplexer would support transparent LAN offerings.

By Tim Greene

Santa Clara, Calif.

OnStream Networks, Inc. has a new member of its broadband multiplexer family, this one designed to give users the option of fractional T-3 services when they don't have enough wide-area traffic to warrant a full 45M bit/sec WAN link.

The BMX28 broadband access multiplexer, to be announced at SuperComm '96 in Dallas this month, can combine voice, data and video traffic for transport through the public telephone network via T-3 lines or fractional T-3 links. It is fully compatible with carrier digital cross-connects.

Fractional T-3 could give users access to transparent LAN services at less than the cost of a 45M bit/sec connection and without having to make the leap to Asynchronous Transfer Mode, according to Thomas Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J.

ONSTREAM'S NEW BROADBAND BOX

BMX28 broadband multiplexer specs

Chassis:	5 and 18 slots
Network interfaces:	Up to four T-3 or fractional T-3 ports
User interfaces:	T-1, High-Speed Serial Interface, Ethernet, V.35 and RS-449
Price:	$15,950 to $35,000, depending on configuration
Availability:	Now

The new product addresses a growing reality. Although ATM is much talked about, users generally buy the lowest cost service that meets their application needs, Nolle said.

A user that wants to aggregate voice, video and data on one link — which describes what ATM is meant to do — may not need to use the more expensive and glamorized ATM service.

"Services are the prime selling point, and users focus more on cost control and less on glamor," Nolle said.

The new device comes in two models, a five-slot and 18-slot chassis. The five-slot reserves one slot for a control module, one for a network card and three for port connections.

The 18-slot version is built for redundancy and a higher port density. It has two slots for controllers, two for the switching matrix that supports multiplexing and interfacing with digital cross-connects in a carrier network, four slots for WAN cards and 10 for port connections.

The BMX28 offers two WAN-card options, one with a single T-3 port and one with two T-3 ports. The device is managed by Simple Network Management Protocol.

The BMX28 is based on the same chassis as the BMX45, but is designed specifically to give low-cost support for service offerings. The BMX45 was designed for use in private networks, according to David Yates, OnStream vice president of marketing.

The smaller of the two chassis, which does not offer redundancy, is suited for customer premise installation where there would be less need for backup and capacity, Nolle said. The larger would be for the carrier central office.

According to Yates, the BMX28 would also allow Internet service providers (ISP) to offer access to the Internet at fractional T-3 speeds. In addition to being a traffic concentrator, the larger chassis could serve as access to trunking between nodes in the ISP network.

It could also support frame relay traffic, picking it up from the user site via High-Speed Serial Interface ports and interfacing with frame relay switches over T-3 trunks.

Yates said the SNMP management is key for carriers that want to be able to get a view of each node from a single platform. Alternatives to the BMX28, such as M13 multiplexers, do not typically support SNMP.

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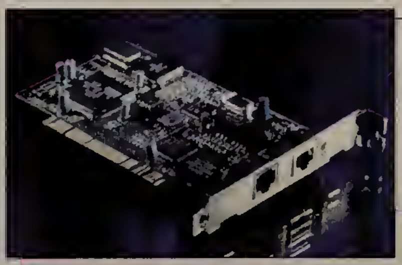

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Racotek

Continued from page 17

to Steve Dunlop, Racotek's manager of product marketing. The software automatically integrates the application with KeyWare and allows over-the-air updates of application changes, he said.

■ Database Agent, which allows developers to use the database structure of their choice as an API. The product manages the exchange of messages between a database and the KeyWare mobile computing environment.

Ira Brodsky, president of Wireless Data-Comm Research in Wilmette, Ill., thinks Racotek in some ways misses the mark. "They are stuck in the paradigm that wireless is a slow, adverse environment, and everyone needs help writing applications," Brodsky said. "Everyone else is going the other way — getting a bigger pipeline and interfacing existing applications to it," he said. Brodsky was referring to products such as IBM's ARTour middleware, which sits between IP or SNA applications and the wireless network and requires no application changes. Racotek also announced 3270 and 5250 terminal emulation last week, which interfaces existing SNA applications to mobile terminals without application reengineering.

©Racotek: (612) 832-9800.

Platinum

Continued from page 17

rently offer more advanced job scheduling integration packages.

Nonetheless, the AutoSys/Adapter for Oracle works with Oracle's Concurrent Manager to bring AutoSys job scheduling to Oracle financial, manufacturing and human resources applications. Likewise, AutoSys/Adapter for SAP R/3 will allow SAP R/3 users to deploy AutoSys as a job scheduler for that environment, working with SAP's Scheduler tool.

Similarly, AutoSys/Adapter for PeopleSoft links AutoSys with the PeopleSoft Process Scheduler so it can oversee tasks conducted by manufacturing, financial, human resources and distribution applications. Platinum has also added an AutoSys/Adapter to its own AutoXfer software distribution tool so users can schedule software dispersals via AutoSys.

AutoSys/Adapters for Oracle and SAP R/3 and AutoXfer are available now. The adapters for PeopleSoft will be available in the third quarter. Pricing starts at $15,000.

©Platinum: (800) 442-6861.

ATM

Continued from page 17

director of the Center for Network Testing Services at MCNC here.

"It is also critical for users to see how their legacy systems and applications will operate in an ATM environment," Agosta said.

MCNC also offers a variety of homegrown tools, such as traffic analyzers and performance managers, that many smaller users may find too expensive to deploy on their own.

Read about other ATM test beds on Network World Fusion. Select News+ then WANs & Internetworking.

http://www.nwfusion.com

Users in North Carolina can usually link directly to VitalNet in locations throughout the state, Agosta said. Users across the U.S. can access the backbone via a carrier's ATM service.

"We end up looking like a local exchange or RBOC to other carriers," Pfeiffer said. "What we end up proving, however, is that users can deploy ATM safely over multiple long-distance hops."

For some users that is a big attraction.

"We can do ATM testing on our own local network, but it is across the WAN that we want to see these ATM devices perform and that's where VitalNet is invaluable," said Phillip Emer, a network engineer in the computing center at North Carolina State University.

Pfeiffer also noted that the VitalNet backbone is not limited to ATM testing. Users can employ it to test token-ring and Ethernet switches and other advanced gear.

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Routers' role changes as both switches, VLANs come into play

By Jim Duffy

The migration to switched internetworks for increasing performance and implementing virtual LANs is changing the role of backbone routers dramatically.

In these new environments, the router is no longer the core collapsed backbone node for physically connecting campus-wide LAN segments. As switches take on that role, routers are being pushed to the edge of the network. The new job is to dictate who has access to the switched backbone, control broadcast traffic and provide WAN access, including access to the Internet.

"We've completely flattened our network," said Ron Hudson, assistant director of network services at Johns Hopkins University in Baltimore. "The only routers we use are at the periphery of our network to provide us Internet connectivity. In order to take advantage of [VLANs], we would need to clean the routers out of the core."

Not a completely dead end

That's not to say that routers or routing is becoming obsolete. On the contrary, router kingpin Cisco Systems, Inc. says sales of its backbone routers are growing at more than 30% annually, mostly to corporate end users. If sales to corporate users are shrinking at all, they are being offset by sales to carriers and Internet service providers (ISP) that need proven IP routing to handle the explosive growth in Internet access (see story).

But for segmenting LANs in corporate backbones, routers are no longer the answer.

At Healthsource, a Hooksett, N.H., health services provider, Corporate Data Networks Manager Ed Braley is counting on switching to minimize collision domains and reduce the number of routed segments. But routing will still be deployed for grouping segments into Layer 3 subnets.

"What switching's going to do for us is allow us to perhaps reduce or stabilize the number of segments we have and shift some of the investment from router ports to switch ports," Braley said. "Then we'll use our routers around the periphery of the LAN network to provide some traffic management at Layer 3 and also to connect out to our remote sites."

Boston Edison Co. is another shop looking to segment LANs with switches instead of routers.

"We're doing it for a couple of reasons — cost, cost and cost," said John Dubiel, manager of planning for Boston Edison. Routers are more expensive than switches because they are more intelligent devices. Yet routers can create bottlenecks in a network because they inspect every packet to determine the path to its destination before forwarding the packet.

The utility is front-ending its router backbone with switches to provide 100M bit/sec connections into file servers and to localize traffic as much as possible, which frees up backbone capacity for higher performance internetworking.

"We could continue to segment down to provide additional performance by adding more and more router ports, but that creates problems because we have multiple people on various segments who want to get to the same file server," Dubiel said. "We try to keep the 80/20 rule going where we try to keep 80% of the traffic local."

Children's Hospital of Philadelphia is also relieving its routers of a LAN segmentation role as switching creeps in.

Routers, however, will now play a vital role in broadcast domain establishment, said M.J. Evenson, manager of technical services at Children's Hospital. "If you don't keep your routers in the picture, you're making it possible for the broadcast traffic [to] get around a lot faster, too," Evenson said. "Unless you can contain the broadcasts, you're going to propagate that traffic all over the place a whole lot faster. You have to create these broadcast domains, and the only way I know how to do it is with routers."

Children's *Hospital's Evenson*

Children's Hospital is upping the speed of its router interfaces to 100M bit/sec and installing Fast Ethernet switches to improve point-to-point bandwidth to workgroups. Ultimately, the hospital wants to migrate to a switched Asynchronous Transfer Mode environment that promises to meld voice, data and video traffic over a common high-speed infrastructure bereft of the multihop bottlenecks routers present.

"I think everybody's sitting, sort of waiting for acquisitions, transfers and mergers to take place for ATM to get here," Evenson said. "Unfortunately, most of our users can't wait, so as network managers, we have to come up with solutions that fix their problem right now."

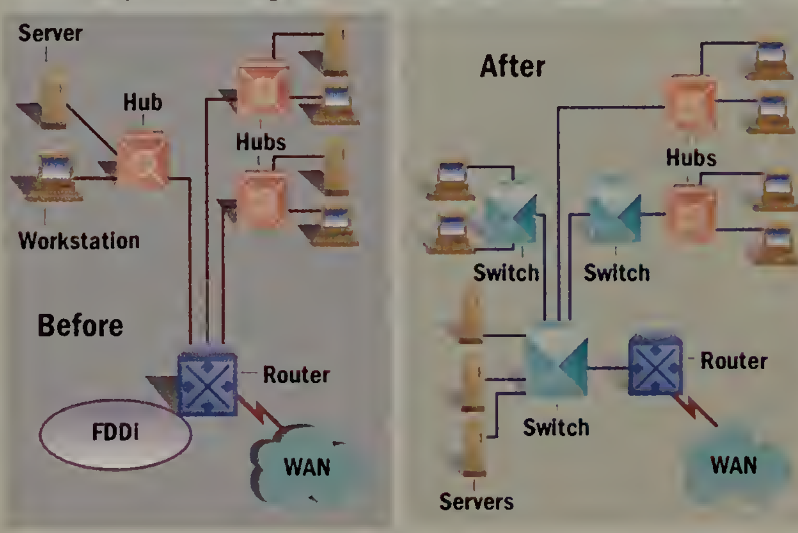
Router redefined

Until ATM arrives, users are attempting to increase the performance of their routed infrastructures without adding more router ports. In so doing, they are redefining the role of the router in their collapsed backbone networks from path determination and packet forwarding engines to just path determination systems; switches will take on the packet forwarding role.

"The premise that you can replace routing with switching is not wholly accurate," said Healthsource's Braley. "I think you can reduce the number of routed segments you have, but I don't think you can replace it yet. I envision us consolidating, but I can't see us replacing any of our routers, quite honestly." ■

THE NEW BACKBONE

For collapsed backbones, routers are being front-ended by switches to increase performance and to centralize servers. In this scenario, routers provide WAN access and packet filtering while switches provide fast frame forwarding.



Is the role of the router changing?

Many vendors say it is, with one notable exception: Cisco Systems, Inc.

Even as users deploy switches in their campus internets, routers are staying put as the anchor of corporate backbones, according to Richard Palmer, Cisco's director of marketing for high-end routing.

"The overwhelming majority of customers are putting in switches and still using [Cisco] 7500-class machines as the backbone," Palmer said. "There are some people looking at a slightly new paradigm" — that of replacing routers in the backbone with switches — "[but] I would have to say it's at the very early stages."

And it's not where 70% of Cisco's high-end router sales are going, Palmer added. Cisco still enjoys 30% to 50% growth in revenue annually from sales of its high-end 7000 and 7500 routers, he said. And less than 20% to 25% are going to carriers and Internet service providers.

"The role of routers remains the same," Palmer said. "The physical placement of the routing, by and large, you can construct differently."

Bay sees choppy waters

Router rival Bay Networks, Inc., though, acknowledges the shift in routing from the backbone to the periphery.

"Routing is still a very key component of an overall network solution," said Randy Ottman, director of mid-range and high-end router platforms at Bay. "But routers, as products, may start looking very different and be in very different places than they were three years ago."

Bay is even advocating moving routers out of the core of the network and moving switches in.

"That traditional collapsed backbone model of a router was really using routers as switches," Ottman said. "Then people were clamoring for more port density on routers. What we don't see today is people clamoring for that."

Remote possibilities

People are also clamoring for routers at remote sites, which prompted Proteon, Inc. to essentially refocus its business on that opportunity.

"There's clearly something going on in the $1,500 and down segment of the router market," said Jeffrey Low, vice president of worldwide marketing at Proteon. "I see the router really becoming the connection point to that switched backbone. The router becomes the legacy infrastructure."

Newbridge Networks, Inc. is one of many vendors proposing a virtual routing capability in switched internets. Under this approach, routers function as route servers for switches interconnecting virtual LANs.

"Backbone routing is necessary and is here to stay," said Stu Aaron, product manager at Newbridge. "But backbone routers are going to start to find themselves deployed more at the edge of the network."

— Jim Duffy

Carrier Services

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Briefs

■ *Meaningful* **national caller ID** *was delayed again as California's two big local carriers —* **Pacific Bell and GTE Telephone Operations** *— were unable to meet the June 1 deadline for conforming to state consumer-protection rules. Pacific Bell has been "overwhelmed" with consumer requests to block caller ID and has not finished mailing the required confirmation letters to those consumers, according to the California Public Utilities Commission.*

■ **NYNEX Corp.** *last week said the president of its two-year-old* **entertainment and information services** *group, Walt Rickard, plans to retire later this year after 30 years with the company.*

■ **Pacific Bell** *last week announced* **dial-up Internet access** *for small businesses and consumers at the industry-magic price of $19.95 a month for unlimited access. At the same time, Pacific Bell and America Online, Inc. said they planned to offer Pacific Bell Internet customers access to AOL content via a few mouse clicks. Pricing and availability of this service, however, have not been nailed down.*

■ **MCI Communications Corp.** *and Microsoft Corp. last week said they will jointly deliver* **audio and document conferencing** *services over the Internet. MCI will provide scheduling services for meetings that use Microsoft's new NetMeeting communications and collaboration software, an MCI spokesman said. No availability date has been set yet.*

■ **AT&T** *last week said it will offer three months of* **free unlimited local toll service** *to Illinois consumers who choose AT&T as their local toll provider by June 30. Beginning Aug. 1, the free service will apply to calls made to locations generally more than 15 miles from the originating site but still within the local calling area. AT&T also launched a price structure it said will make its services about 20% cheaper than competitor Ameritech Corp.'s in several areas.*

Six-second call on an 800 line? No problem

By David Rohde

AT&T is gingerly introducing a pricing plan to help network managers deal with the plague of extremely short 800 and 888 calls that can run up call centers' telecommunications bills.

The carrier's unannounced new plan dispenses with the typical 18- to 60-second initial billing period that kicks in regardless of a call's duration. The new CustomNet Option C provide 6-second initial calling period for inbound calls, then charges per second thereafter.

Quietly slipped into AT&T's popular CustomNet calling plan last month, Option C charges a basic peak-hour rate of 5.7 cents for super-quick calls rather than the standard 15.9 cents for the first 30 seconds.

Analysts cautioned that CustomNet Option C is not necessarily the best choice — even for users routinely forced to pay for lickety-split phone calls and hang-ups, such as those with frequently misdialed 800 vanity numbers.

Because Option C's 6-second rate is lower — but not proportionately lower — than the 30-second rate, the result is that 1-minute and other moderately short calls are actually more expensive (see graphic).

AT&T officials confirmed that CustomNet Option C, which went into effect last Monday, is the first of the carrier's billing plans to chop the initial calling period down to 6 seconds.

AT&T's basic residential and commercial schedules use 60-second increments. Another of AT&T's inbound/outbound services, UniPlan, utilizes a 30-second initial period, though inbound calls are charged at a 1-second rate after the initial period and outbound calls are charged every 6 seconds.

AT&T's heavily installed Software Defined Network (SDN) virtual private network service uses 18-second initial periods. Other large carriers' combination inbound/outbound plans, such as MCI Communications Corp.'s Vision and Sprint Corp.'s Clarity, use 18-second initial periods, too.

But in cable TV ads and elsewhere, smaller carrier LCI International, Inc. is harping on its 6-second billing increments. LCI officials were intrigued that AT&T would try out this change first on CustomNet, whose rates and volume-discount schedules are designed more for midsize and smaller businesses.

Roy Gamse, LCI's senior vice president of marketing, said the move was an AT&T ploy he labeled "look-alike tariffs" to meet competitors' unique deals.

For example, LCI has widely advertised a flat-rate residential program, whereas AT&T has silently included a similar arrangement into its tariffs. "If you say you're on LCI, they'll pull this out of their back pocket," Gamse said. But there's usually a catch, he claimed. AT&T's flat-rate plan uses 60-second billing, and the new 6-second CustomNet plan has higher rates than LCI's.

The way AT&T spokeswoman Karen Way sees it, the carrier went in this direction because "there must be a need at the smaller businesses to deal with really short calls."

She added that non-CustomNet users are not necessarily locked into an 18- or 30-second initial period if they're signing individually negotiated contract tariffs. "That is definitely up for grabs in coming up with the contract," Way said. ■

Which plan is best for you?

The six-second initial-period plan for CustomNet inbound saves on extremely short and long calls, but is not the best option for moderately short calls.

Call duration	Option A 15.9 cents for first 30 secs. + .53 cents for each additional sec.	Option B 17.4 cents for first 30 secs. + .58 cents for each additional sec.	Option C 5.7 cents for first 6 secs. + .52 cents for each additional sec.
6 sec.	15.9	17.4	5.70*
18 sec.	15.9	17.4	11.94*
30 sec.	15.9*	17.4	18.18
60 sec.	31.8*	34.80	33.78
Each additional minute	31.8	34.80	31.2*

*The numbers in red represent the best option for that particular call duration.

SOURCE: AT&T, BRIDGEWATER, N.J.

Local interconnection battles forthcoming

By David Rohde

Washington, D.C.

Do not be surprised if the terms "lawsuit" and "telecommunication reform" start appearing in the same context.

The threat to go to court comes from some opponents of a key Federal Communications Commission proposal to get old and new local carriers to interconnect their networks. The opponents' beef: State regulators are entitled to have a say in the matter, but the FCC's proposal cuts them out of the process.

The dispute, which escalated in a flurry of recent comment letters to the FCC, threatens to delay the arrival of meaningful local competition.

Under the FCC's proposal, there will be a strict single national set of rules for interconnecting competitors' networks, rather than allowing states to vary the method according to local conditions. The move is heavily backed by potential local carrier AT&T, which proposed as a national standard 11 points of interconnection between itself and regional Bell operating companies in the local exchange (*NW*, April 29, page 31).

In the letters, regulators from dozens of states maintained that the FCC has no right to impose one national standard.

The FCC's "apparent intent to usurp state re- sponsibilities is directly counter to provisions of the [telecommunications law]," said the Virginia Corporation Commission, which regulates phone companies and other utilities.

But apart from some of the RBOCs, the state regulators' arguments did not draw broad support. The U.S. Justice Department said it is firmly behind the FCC's move. Generally, so were users and manufacturers.

The Information Technology Industry Council said the FCC should establish uniform parameters so equipment makers build the right interconnection gear. The International Communications Association (ICA) user group agreed, calling the interconnection rule-making the most important one on the FCC's agenda.

"The worst possible outcome for this proceeding would be for the commission to not adopt extensive and explicit national rules," said ICA General Counsel Brian Moir. State-by-state variations would result in a "balkanized telecommunications environment," he said.

Moir pleaded with the commissioners not to believe RBOC claims that widespread local competition has already developed. "If such developments actually existed, much of the 1996 Telecom Act would not have been necessary," he said.

The Ad Hoc Telecommunications Users Committee, representing purchasers of multimillion-dollar telecommunications contracts, said the FCC should force RBOCs and other so-called incumbent local exchange carriers (LEC) to unbundle network elements at multiple points nationally.

"History teaches that when the commission leaves the incumbent LECs to their own devices and does not prescribe an aggressive plan, delay, abuse and inaction prevail," said Colleen Boothby, an attorney with the Ad Hoc committee. ■

WAN MONITOR

'Net telephony's inexorable march

Previously the province of hobbyists and ham radio aficionados, voice and video over IP networks (especially the Internet) is being seriously looked at by many people — corporate end users and some big names in the computer and telecommunications business, including Microsoft, Netscape, IBM and AT&T.

The formula is simple: Start with two multimedia PCs or Macs, add some inexpensive software available on the Web and voila — free (or nearly free) phone calls.

There are drawbacks, to be sure: The quality is highly dependent upon available bandwidth and inherent delays on the Internet; there is really no compatibility between competing programs; and connecting to another party requires a server system or use of an IP address.

On the compatibility front, efforts by both Netscape and Microsoft to incorporate standards-based Internet telephony, video and multimedia conferencing into their platforms (Navigator and Windows, respectively) promise a common denominator — an Internet telephony Esperanto that all programs can speak.

Quality is mostly limited by bandwidth (consider that a typical user's Internet connection is 28.8K bit/sec, while an LD voice channel is allotted 64K bit/sec) and the compression required to fit a voice or video signal over that limited bandwidth.

This trade-off between available bandwidth and compression isn't too much of a problem for voice communications, but existing videoconferencing programs don't yet offer quality signaling at anything less than ISDN speeds. (You can expect video rates of less than 1 frame/sec on a 28.8 K bit/sec connection). This limitation will be alleviated as Internet access speeds increase (through adoption of ISDN, ADSL and cable modems) and as the Internet backbone increases in capacity.

The other major quality issue concerns the inherent latency of Internet connections. As it works now, Internet telephony has enough latency to force many calls, especially overseas calls, into a half-duplex, over-and-out mode. Again, progress is being made on this front, as emerging standards such as Real-time Transport Protocol and Resource Reservation Protocol are adopted.

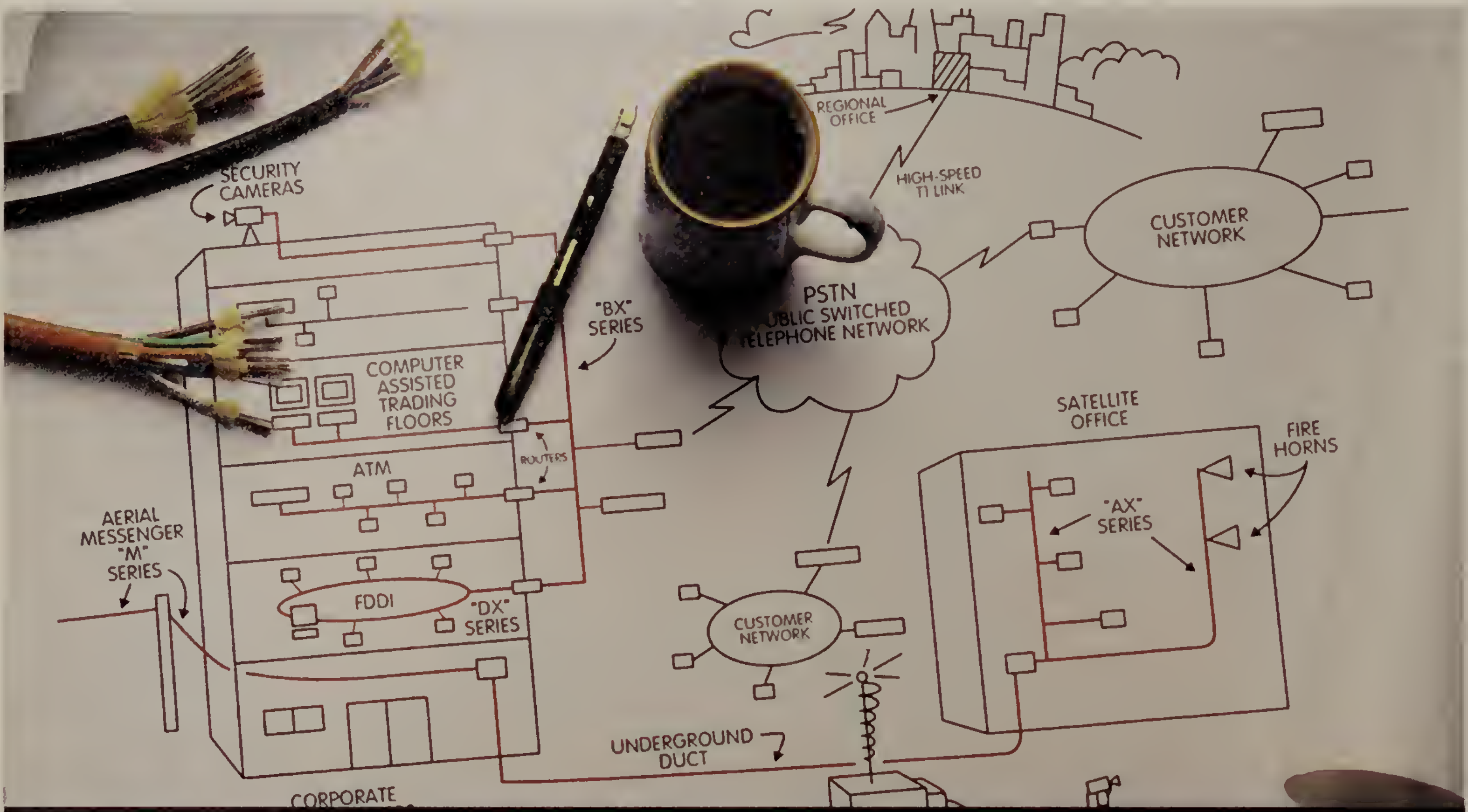
Daniel Briere and Christine Heckart

An interesting approach to solving these issues has been hinted at by AT&T's WorldNet service. Internet service providers may begin to offer specialized services that give different levels of priority to different kinds of Internet traffic, with real-time applications being assigned to a special category of service (with greater guarantees of bandwidth and lower latency) — and probably with a related increase in cost.

A likely growth area is within the intracompany sphere. Geographically dispersed organizations could easily add telephony functionality to their existing WANs and intranets.

In the longer term, there are issues of cost (Is it really cheaper to make calls over the Internet than over PSTN?) and infrastructure (What happens to the Internet backbone when millions of people are trying to videoconference over it?) that may retard the growth of Internet telephony. In the meantime, look for continued growth of Internet telephony among Internet hobbyists and corporate users looking for a bargain.

Briere is president and Heckart is director o broadband with TeleChoice, Inc., a consul tancy in Verona, N.J. They can be reached a dbriere@telechoice.com and checkart@tel choice.com.



ULTRA FOX

Move to the Head of Your Network Design Class: Seven Lessons to Raise Your Fiber Optic Cable IQ

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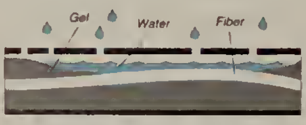
In gel-filled loose-tube cables, exposed fibers can be destroyed by moisture that seeps through stress fractures in the cable jacket. In contrast, our Ultra-Fox™ cables provide three layers of fiber protection: an outer jacket, a subcable jacket, and a 900µm tight buffer.

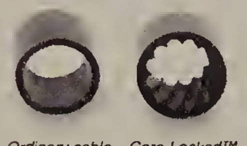


Gel-filled cables leave delicate optical fibers exposed to the damaging effects of water.

2. STRESS SHORTENS FIBER LIFE

Routine stress, such as tight bends or rough handling during installation, can degrade fiber life and lead to premature failure. While our competitors settle for fibers proof-tested at 50kpsi, our Ultra-Fox™ cables are proof-tested at 100kpsi to guarantee durability and vastly extend fiber life.

3. NOT ALL CABLE JACKETS ARE CREATED EQUAL



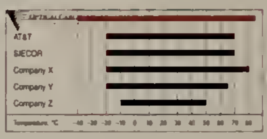
Ordinary cable jacket
Core-Locked™ jacket

Unlike the standard sleeve-type cable jacket, our Core-Locked™ jacket is extruded under high pressure over the cable's core. This provides 25% more jacket material for enhanced strength, and prevents slippage and jacket damage during installation.

4. DUAL USE (INDOOR AND OUTDOOR) MEANS IMPROVED RELIABILITY AND ECONOMY

Advanced construction features such as a 900µm tight buffer and 100kpsi proof-tested fibers, along with water-, fungus- and UV-resistant design, make Ultra-Fox™ cables durable and flexible enough for both indoor and outdoor use. The result is higher reliability with lower costs for installation and maintenance.

5. EXTREME TEMPERATURES CAN CAUSE FIBER FAILURE



Designed with the best attributes of military tactical cable, Ultra-Fox™ cables have an operating temperature range 25% greater than our competitors' cables, so they can better withstand temperature extremes caused by weather, machines, and HVAC systems.

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Hubs • Switches • Adapters and other equipment

Briefs

■ **Intel Corp.** *last week added three adapter cards to its repertoire of* **10M and 100M bit/sec Ethernet** *products. The Express 10/100 Downlink card is designed for connecting Fast Ethernet workgroups to 10M bit/sec LANs and costs $1,245.*

The EtherExpress Pro/100 ISA Adapter lets companies attach ISA-based PCs to their Fast Ethernet LANs at $199 a pop. The EtherExpress Pro/10+ Adapter, a PCI-based card, provides full-duplex Ethernet, and at $179, it costs up to 20% less than the original version. All the cards are available now.

Intel: (800) 525-3019.

■ **Kingston Technology Corp.** *last week announced a PCI-based Ethernet adapter that supports both 10M and 100M bit/sec. The* **EtheRx PCI 10/100 Fast Ethernet Adapter** *features an autonegotiation scheme, so that it operates at the appropriate line speed. The adapter starts at $139 and is available now.*

Kingston: (800) 435-2620.

■ **Digital Equipment Corp.** *last week introduced a set of servers optimized for* **multimedia** *applications supporting video, audio and animation. The Mediaplex Network Server line runs on Unix software and Alpha hardware, and supports the major authoring and application development tools that adhere to Microsoft Corp.'s Media Control Interface and Web interfaces.*

The family comes in three basic configurations; one for workgroups and two for departments. The servers can be configured to handle 40 to 80 video streams at 1.5M bit/sec, and can connect to either FDDI or switched Ethernet networks. Available now, the servers start at $5,995. Future editions will support Windows NT and Asynchronous Transfer Mode.

Digital: (800) 344-4825.

SunSoft gives NFS a Web facelift

By Ben Heskett
Menlo Park, Calif.

SunSoft, Inc. has found a fast new protocol for file access over the Internet right in its own backyard.

The company this week will announce a revised edition of the Network File System (NFS) protocol — developed by Sun Microsystems, Inc. over 10 years ago and adopted by more than 200 vendors — optimized for accessing files from the World-Wide Web. NFS enables PCs, Unix machines and even mainframes to share hard disks over a network.

The new technology, called WebNFS, differs from HyperText Transfer Protocol (HTTP), which SunSoft officials said has been used as a universal communications protocol.

WebNFS can transfer Web documents at up to 10 times the rate of existing protocols such as File Transfer Protocol (FTP) and HTTP, according to SunSoft. This could make it a natural fit for users of NFS-based Web servers and future customers of network appliances being pushed by Oracle Corp. and Sun.

SunSoft's strategy is to make WebNFS ubiquitous by licensing the technology to other vendors as well as pitching it to the Internet Engineering Task Force as a standard.

Analysts said if WebNFS is as fast as SunSoft claims, it will be adopted quickly.

WebNFS has already received endorsements from IBM's RISC System/6000 unit and Oracle, which plan to integrate the NFS enhancements into their products. Auspex Systems, Inc., Sequent Computer Systems, Inc. and Spyglass Associates are also lining up behind the new protocol. In addition, Netscape Communications Corp., Silicon Graphics, Inc. and Hewlett-Packard Co. are currently in negotiations with Sun.

And not surprisingly, Sun Microsystems Computer Corp., Sun's hardware division, will unveil a WebNFS edition of its Netra NFS server in July. WebNFS will also be embedded in SunSoft's brand of Unix — Solaris — during the next year.

WebNFS is expected to complement existing Internet protocols such as HTTP.

"The Web is still in its infancy and HTTP was supposed to do everything. You can't have that," said Sanjay Sinha, a Solaris marketing manager at SunSoft. "WebNFS is going to be a component of a browser; it's not meant to displace other protocols"

WebNFS will be optimal for transferring static files and Web pages, but he said those pages built dynamically and incorporating a database will still need to transfer information via HTTP. ■

THE LOWDOWN ON WEBNFS

What it is:

▶ An extension to Sun's Network File System that will allow clients to access files on an NFS server over the 'Net using a browser or a thin client

Supporters:

▶ Oracle and IBM, among others; HP, SGI and Netscape are considering it

Competing or complementary technologies:

▶ Internet file-sharing standards such as FTP and HTTP

Vendors ally on wireless LAN front

By Joanie Wexler

Wireless LAN vendors are finally getting their acts together — by getting together.

The latest gang to try sparking the lackluster wireless LAN market by tackling multivendor product interoperability includes Lucent Technologies, Aironet Wireless Communications and Digital Ocean, Inc. The vendors have agreed to jointly develop the Inter-Access Point Protocol (IAPP), which will specify how access points — the bridges or base stations that anchor wireless LANs — communicate with each other.

The move comes on the heels of Proxim, Inc.'s announcement that it will offer its RangeLAN2 wireless LAN technology for client-to-access point and interaccess point communications as an open specification through the Wireless LAN Interoperability Forum (*NW*, May 20, page 10). That effort was announced just a few weeks after the formation of the Wireless LAN Alliance, a group of vendors aiming to collectively educate the industry on the benefits of wireless LANs.

And just last week, five vendors — Advanced Micro Devices, Breeze Wireless Communications, Inc., Pulse Engineering, Inc., Raytheon Electronics and Xircom, Inc. — said they have conducted successful interoperability tests of products based on

See **Wireless,** *page 26*

CONSORTIA-MANIA

Consortium	Sampling of members	
Inter-Access Point Protocol group	▶ Aironet	▶ Lucent
	▶ Digital Ocean	▶ Others invited
Wireless LAN Interoperability Forum	▶ AMP	▶ Raytheon Electronics
	▶ Comtron	▶ Seiko Epson
	▶ Data General	▶ Time Master
	▶ Norand	▶ Zenith Data Systems
	▶ Proxim	
Wireless LAN Alliance	▶ 3Com	▶ Norand
	▶ Aironet	▶ Proxim
	▶ Digital	▶ Raytheon Electronics
	▶ IBM	▶ Windata
	▶ Lucent Technologies	▶ Xircom

Peering into Artisoft's future

By Ben Heskett
Tucson, Ariz.

Artisoft, Inc. will unveil the latest version of its LANtastic network operating system this week in the hopes of providing an inexpensive alternative to Microsoft Corp. and Novell, Inc. products in small LAN environments.

Version 7.0 features a dedicated server option and a modem-sharing enhancement. It is also priced aggressively starting at $999 for unlimited licenses.

Artisoft officials said they are counting on the growth of small businesses of 10 or less users to propel LANtastic's into new accounts. The company already has an installed based of 5 million users and holds the biggest share of the peer-to-peer network operating system market, according to analysts.

Company officials said Artisoft's recent acquisitions of remote communications and telephony vendors should enable it to expand LANtastic's capabilities, as well.

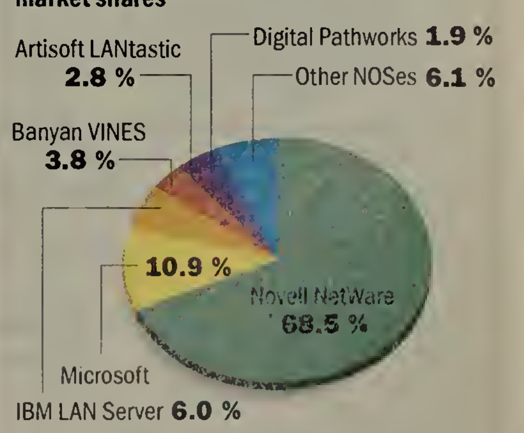
Meanwhile, LANtastic users said they received what they asked for in Version 7.0.

Amcon Distributing Co., based in Omaha, Neb., turned to LANtastic two years ago after the wholesale food distributor determined that NetWare took too much time to maintain.

See **Artisoft,** *page 26*

CAN LANTASTIC 7.0 WIN ARTISOFT A BIGGER PIECE OF THE PIE?

1995 worldwide LAN operating system market shares



Total units shipped: Roughly **29 million**

SOURCE: IDC, FRAMINGHAM, MASS

NET RESULTS

Layer 3 switching is good first step

Current routing software just doesn't cut it on true switching hardware, which is why you've been reading so much lately about Ipsilon Networks, Inc.

Ipsilon has been talking up its Layer 3 switching technology, which embraces a new way for a LAN switch to more efficiently handle traffic via integrated Layer 3 or routing functionality. We call this protocol switching and define it as the first change vendors must make so traditional routing software is suitable for switched hardware platforms.

Skip MacAskill and Melinda Le Baron

A traditional router goes through a lengthy process handling each packet it receives, and the latency involved is one of the main reasons that LAN switch vendors have promoted the idea of Layer 2 switching instead. The typical router triage process, which takes a relatively long time in LAN terms and chews up substantial memory, was necessary because of the enormous number of protocols a backbone router needs to process.

Many vendors' marketing presentations have touted Layer 3 switching enhancements, but the plans have included little detail about how routing functionality will be implemented on switching platforms.

In protocol switching, the first packet in a source-address/destination-address combination goes through the traditional process. The state information about this connection is then stored, and subsequent packets of the conversation are sent through the router with only a single look up in the new state table. Use of this method greatly decreases the amount of instructions processed and searches that occur each time a packet is received, thereby reducing overall delay.

Applications benefitting from this enhancement will be those that have extended conversations between pairs of systems. File transfer, client/server and graphically oriented applications will benefit, as well, due to the large amount of data transferred between two specific end points. If most of the traffic can be characterized by short conversations with low data volumes, protocol switching's impact will be minimal.

Ipsilon extends protocol switching technology even further through the creation of virtual circuits in Asynchronous Transfer Mode or frame relay networks. These virtual circuits allow the bandwidth to be divvied up and used more efficiently, thus avoiding the network slowdown effect that large data streams can generate. The ability to prioritize the different traffic types within these circuits will also let companies deliver specified quality of service levels to particular applications.

Users should ask router vendors about their plans to implement this type of protocol switching and how it will be tied to quality of service features in the future. Users should also get full implementation details and quantify the impact of traditional routing on switching performance before making any purchasing decisions.

Le Baron is a research director and MacAskill a senior research analyst in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached at inquiry@gartner.com or (203) 316-1111.

Artisoft

Continued from page 25

"The LANtastic network basically runs itself, which is why we made the change," said Mike Kepler, a network administrator at Amcon.

Kepler said he was attracted to LANtastic because it would work with the hodgepodge of desktop operating systems.

More than 200 LANtastic nodes are installed at Amcon.

LANtastic is based on a peer-to-peer networking strategy that does not necessarily rely on a central server, though that is now an option with Version 7.0. The new dedicated server option can support roughly 15 to 25 end nodes.

Kepler uses the new LANtastic dedicated server option for accounts payable and receivable applications, which the accounting department accesses from the server every day.

Amcon is also taking advantage of Artisoft's new modem-sharing capabilities by consolidating a host of modems on one T-1 line. LANtastic 7.0's shared modem feature enables modem requests to be routed to the proper LAN node.

LANtastic 7.0 is expected to ship June 17. The new version is priced at $119 for a single-user license and $499 for 10 users.

©Artisoft: (520) 670-7100.

MORE ONLINE

Plug into Network World Fusion
(http://www.nwfusion.com)
for more info, including:

- **A wireless LAN overview**
- **A comparison of the strengths and weaknesses of wireless LANs**
- **A look at Proxim's RangeLAN2 interface**

Select News+ then Local Networks.

Network World Fusion

Wireless

Continued from page 25

the draft 802.11 specifications for radio communications.

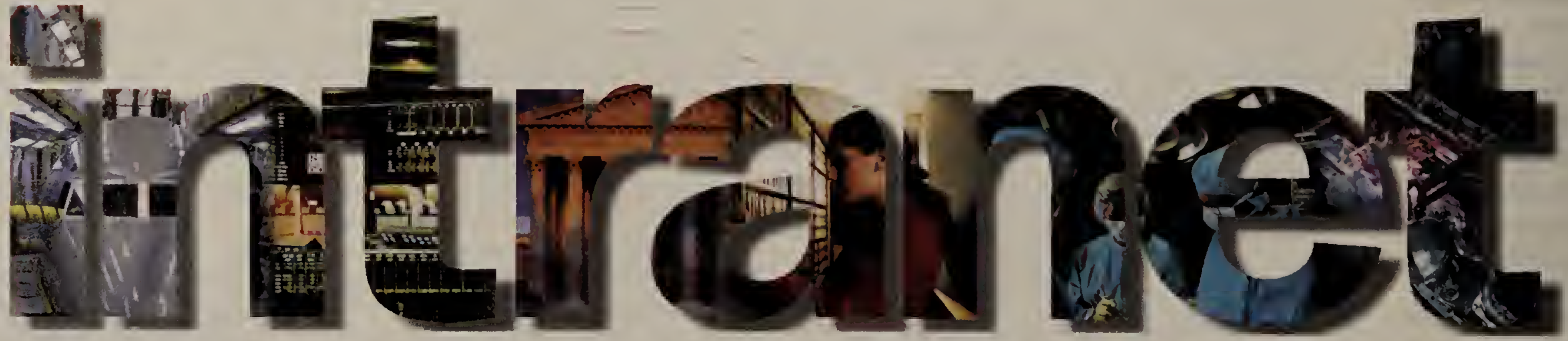
The new IAPP group's technology will serve as an adjunct to the emerging IEEE 802.11 standard specifying how LAN adapters in client devices communicate with access points, explained Todd Smith, director of product marketing at Aironet, which makes the ARLAN wireless LAN.

The access-point work has not yet begun, and its completion depends on finalization of the 802.11 specification, Smith said.

The trivendor group hopes, though, to have its specification in place by year-end and that compliant products will emerge in early 1997, he said.

Interaccess-point communications could be useful for companies that want to use various wireless LAN products optimized for different applications. ■

Cabletron's



seminar

Intranets are a hot topic right now. Everyone has an opinion on why you need one, who should use it–even what it can do for your company. There's plenty of information about the end result, but the "experts" tend to gloss over the nuts and bolts details of how to build one.

Plan on attending **Intranet Essentials**. This convenient, FREE half-day seminar covers what an intranet really is and what you need to construct a network infrastructure that can hold up under the demand for increased bandwidth and reliability. Whatever industry you're in–medical, manufacturing, financial, education or others–you'll get solid advice you can put to use immediately.

participating cities and dates

Toronto ....June 4
Philadelphia ....June 6
Washington D.C.....June 11
Atlanta ....June 12
Boston ....June 18
Chicago................June 19
Cincinnati ....June 21
Denver ....June 25
San Francisco ......June 26
Houston ....June 27
Los Angeles ....June 28

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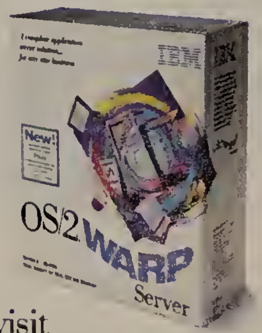


WIRED WINDOWS

Paying attention to passwords

While today's networks allow us to provide end users with what we consider the best of everything, there is an annoying side effect: password proliferation.

Each new desktop and network operating system (NOS) — and, in many cases, each new application — means one more password for the end user to remember. It also means another utility for the network manager to master, usually involving yet another supervisory account with one more password to memorize.

Windows NT has a decided advantage over NetWare in this area. NT can manage and synchronize your NT password with your NetWare password. One password to learn, one administrative program to master. You can't do this yet if NetWare is your NOS platform, but the introduction by Novell, Inc. of Novell Directory Services for NT later this year could change that.

An interesting announcement last week from Microsoft Corp. and Proginet Corp. shows that some people are at least thinking about the password proliferation problem and trying to do something about it.

Proginet, best known for its mainframe-to-LAN file transfer software, has developed a new product called SecurPass. It provides for single sign-on and centralized security password control across mainframes, AS/400s and Windows NT Server-based LAN environments.

This password synchronization and single sign-on solution covers the primary IBM mainframe operating system (now called OS/390, but previously known as MVS), the AS/400 operating system and all desktop operating systems that are integrated with Windows NT Server security.

Dave Kearns

The end user's password changes are kept in sync regardless of whether the changes are initiated in the host or Windows NT Server environment.

Significantly, user IDs do not have to be identical for the password synchronization to work. Instead, an NT-based utility allows the administrator to map accounts between the NT system and the larger one.

The Windows NT server portion of the product, including administrative and synchronization tools, will ship with the next release of Microsoft's SNA Server, due this fall. Pricing has not been announced for the host-based portion, but it is due to ship at the same time as the new SNA Server.

There are those in the security community who hold that having identical passwords on all platforms can lead to a serious security compromise. They argue that if the password is discovered, more systems are compromised. Most believe, however, that multiple passwords lead to easier discovery by a hacker, since people tend to write them down or keep them in plain text files because there are so many to remember.

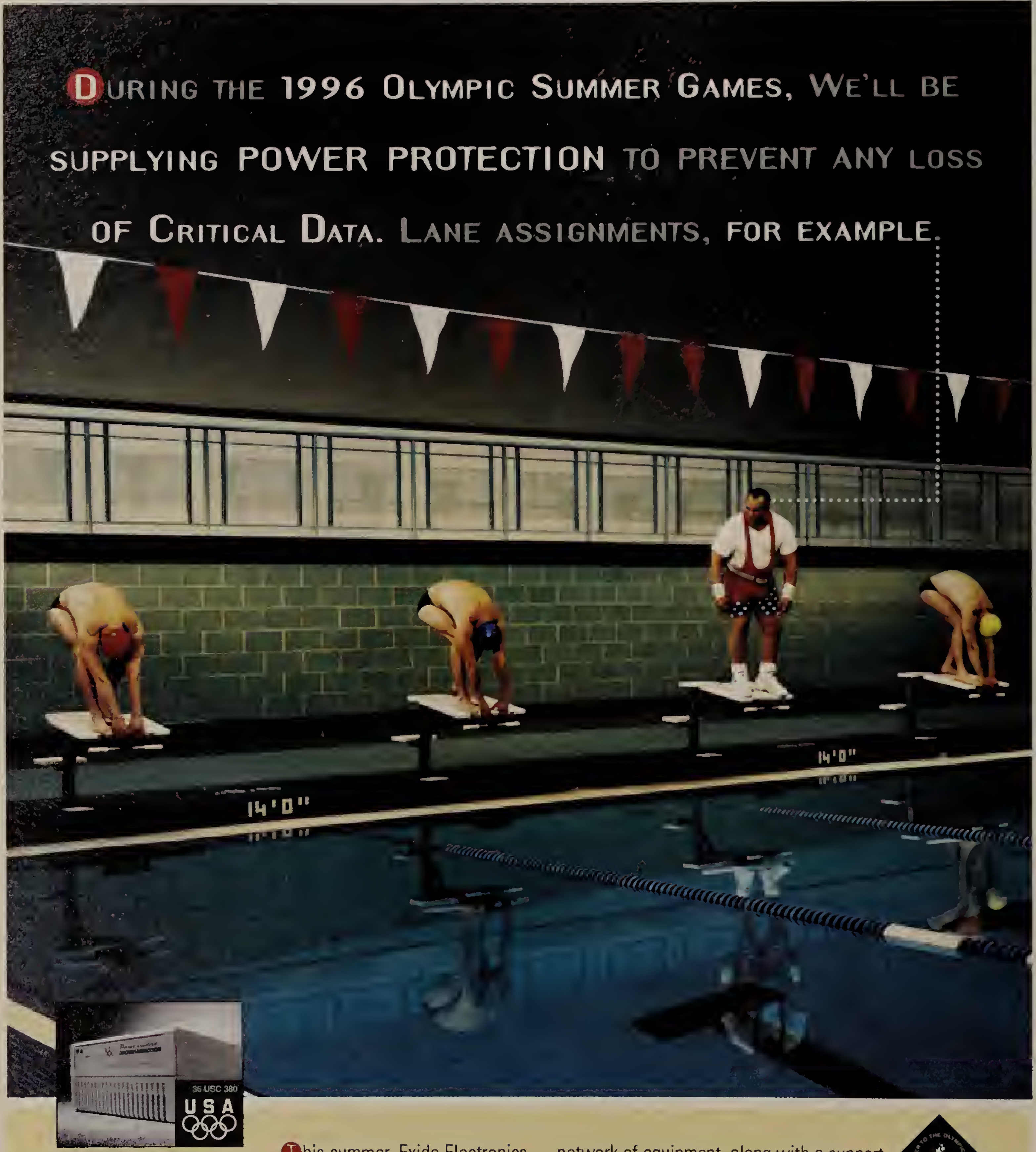
SecurPass goes a long way toward easing the burden of security and password administration. Novell, take note.

Kearns, a former network administrator, i a freelance writer and consultant in Austin Texas. He can be reached at dkearns@msn.com

Tip of the week

If you're still trying to decide between Windows 95 and Windows NT Workstation for your next desktop platform, Microsoft has prepared a document that might help you decide. "The Best Way to a 32-bit Desktop: Windows NT Workstation 4.0 and Windows 95" can be accessed at http://www.microsoft.com/windows/bestway.htm.

See us at Comdex, Booth # 949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Client/Server Applications

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Briefs

■ **Informix Software, Inc.** *of Menlo Park, Calif., last week announced Version 7.2 of its Informix-OnLine Dynamic Server database management system, which includes greatly expanded* **parallel processing** *capabilities. The updated database includes a data replication feature that automatically copies changes made in one database to an unlimited number of networked database servers.*

It is available now on Unix and will be available on Windows NT by September. Pricing is $1,500 per development license and $1,125 for a minimum five-user run-time license.

Informix: (415) 926-6300.

■ **PeopleSoft, Inc.** *of Pleasanton, Calif., has unveiled a set of client/server applications designed for* **manufacturing facilities.** *The PeopleSoft for Manufacturing product line, aimed initially at discrete manufacturers, is based on the company's PeopleTools application development tool set, which lets customers modify and customize the software. A key element, based on software from Red Pepper Software of San Mateo, Calif., is the PeopleSoft Product Configurator, which lets customers define a product's characteristics and analyze how, when and whether the product can be built. Pricing varies based on configuration.*

PeopleSoft: (510) 225-3000.

■ **DBMX, Inc.** *of San Francisco last week introduced a tool for managing Oracle Corp. databases. The company's Enterprise Server Manager (ESM), based on the Tivoli Management Environment, is meant to simplify and automate a full range of tasks associated with managing large, distributed* **Oracle7** *sites. ESM supports the Simple Network Management Protocol-based RDBMS-Management Information Base and Oracle's Private Database MIBs. Pricing for each of the three ESM modules starts at $105 per concurrent user.*

DBMX: (415) 778-8350.

New messaging systems pose tough choice for users

Report finds that next-generation products fall short.

By Barb Cole

Next-generation messaging products have arrived — as has uncertainty surrounding which product to choose.

The choices are complicated by the fact that even client/server messaging systems lack key features, such as Internet and multivendor messaging system connectivity, said Chris McGrath, systems engineer at Mutual Life Assurance Co. of Canada, an insurance company in Waterloo, Ontario.

Following the recent release of Lotus Development Corp.'s Notes 4.0 and Microsoft Corp.'s Exchange, and given the impending shipment of Novell, Inc.'s next-generation GroupWise 5.0 later this year, many mail administrators are kicking the tires on several offerings.

Download a series of articles on migrating to client/server messaging from Network World Fusion (http://www.nwfusion.com). Select News+ then Client/Server Applications.

NetworkWorld Fusion

"A lot of companies are a bit confused right now," said Steven Mahaney, manager of electronic messaging and groupware infrastructure services at pharmaceutical giant Pfizer, Inc. in New York. "There's a lot of competition between Internet-based offerings, traditional groupware and electronic mail packages, as well as several new client/server messaging systems," he said.

Pfizer is a big Lotus cc:Mail customer that is migrating some end users to a growing Notes network and others to an intranet based on software from Netscape Communications Corp.

A recent report, which rated client/server messaging systems from Lotus, Hewlett-Packard Co., Microsoft and Novell, found that most of the products fell short in some way when stacked up against user requirements.

"The enterprise messaging offerings are approaching, but not yet reaching the goal of customer requirements," said Gary Rowe, a principal at Rapport Communication in Atlanta and coauthor of the190-page report dubbed "Decision '96."

Customers want low-cost, secure and manageable messaging products, Rowe said. The vendors are still trying to overcome a proprietary past, while improving in the directories and management areas, he added.

According to the report, client ratings were a virtual dead heat with Lotus Notes edging out OpenMail and Exchange (see graphic). Notes stands apart because its client fully integrates mail, discussion databases, application development and forms. OpenMail ranked second, largely because it provides a consistent graphical user interface across Windows, Macintosh and Unix platforms.

The scores were based on product availability, manageability, multiple platform support and migration, Rowe said.

On the server side, HP led the pack due to its product maturity, management tools and support for various clients.

In the groupware area, it was Notes all the way because it offers a strong document store that allows information to be categorized in a structured format. Exchange ranked second thanks to its support for the easy-to-use Exchange Forms Designer and Microsoft's Visual Basic tool for application development. ■

How the messaging products stack up

Product	Client scores	Server scores	Groupware scores
Lotus Notes	74.5	73.5	88
HP OpenMail	73.8	82.5	54.5
Microsoft Exchange	73.5	78.5	67.5
Novell GroupWise 5.0	70.5	63	63.5

Scores based on a possible 100 points.

SOURCE: DECISION '96 REPORT, RAPPORT COMMUNICATION, WASHINGTON, D.C.

Testing tool tackles 32-bit Windows applications

By John Cox

Woburn, Mass.

SQA, Inc. last week released a 32-bit edition of its automatic testing suite for client/server applications based on 16- and 32-bit Windows software.

Previously, SQA Suite only supported 16-bit applications, but Version 5.0 can be used to test 32-bit Windows 95 and Windows NT programs. The offering, which contains three related tools, is also capable of testing 32-bit OLE custom controls.

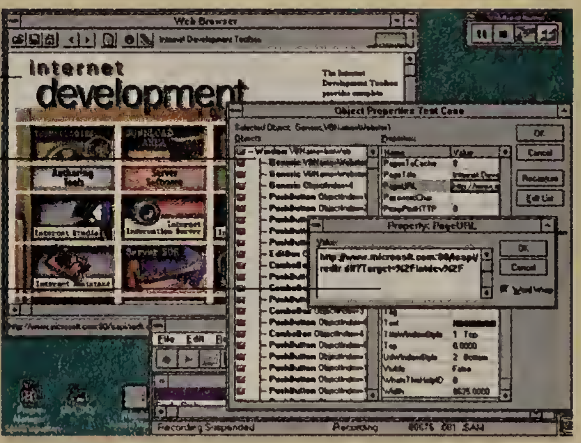
"You can now write the test scripts on one Windows operating system, then move both the application and the script to another [Windows] platform and test it there, with the script unchanged," said Eric Schurr, vice president of product management and marketing for SQA of Woburn, Mass.

SQA Suite 5.0 also includes another key change: It incorporates Sybase Inc.'s SQL Anywhere relational database management system (formerly known as Watcom SQL), as its test repository. The compact SQL Anywhere database replaces what had been a file-oriented data manager, enabling application testers to store much larger amounts of data in SQA Suite, Schurr said.

Client/server test tools are becoming increasingly important as developers try to determine whether their applications will run as planned across fast-changing network infrastructures.

SQA's competitors include Compuware, Inc. and Segue Software, Inc.

SQA SUITE 5.0: TESTING SOFTWARE FOR OLE CONTROLS



SQA Suite reads all 32-bit OLE controls in an application window.

It can select and view objects and their properties, even if invisible.

With this information, SQA can test how objects behave.

Beta testers for SQA Suite 5.0 said they welcomed the changes and that the new release has proven to be stable. The software's availability on 32-bit platforms is "essential" to Geographix, Inc.'s GeoScience Group, which develops software for analyzing oil and gas exploration data and for managing production facilities.

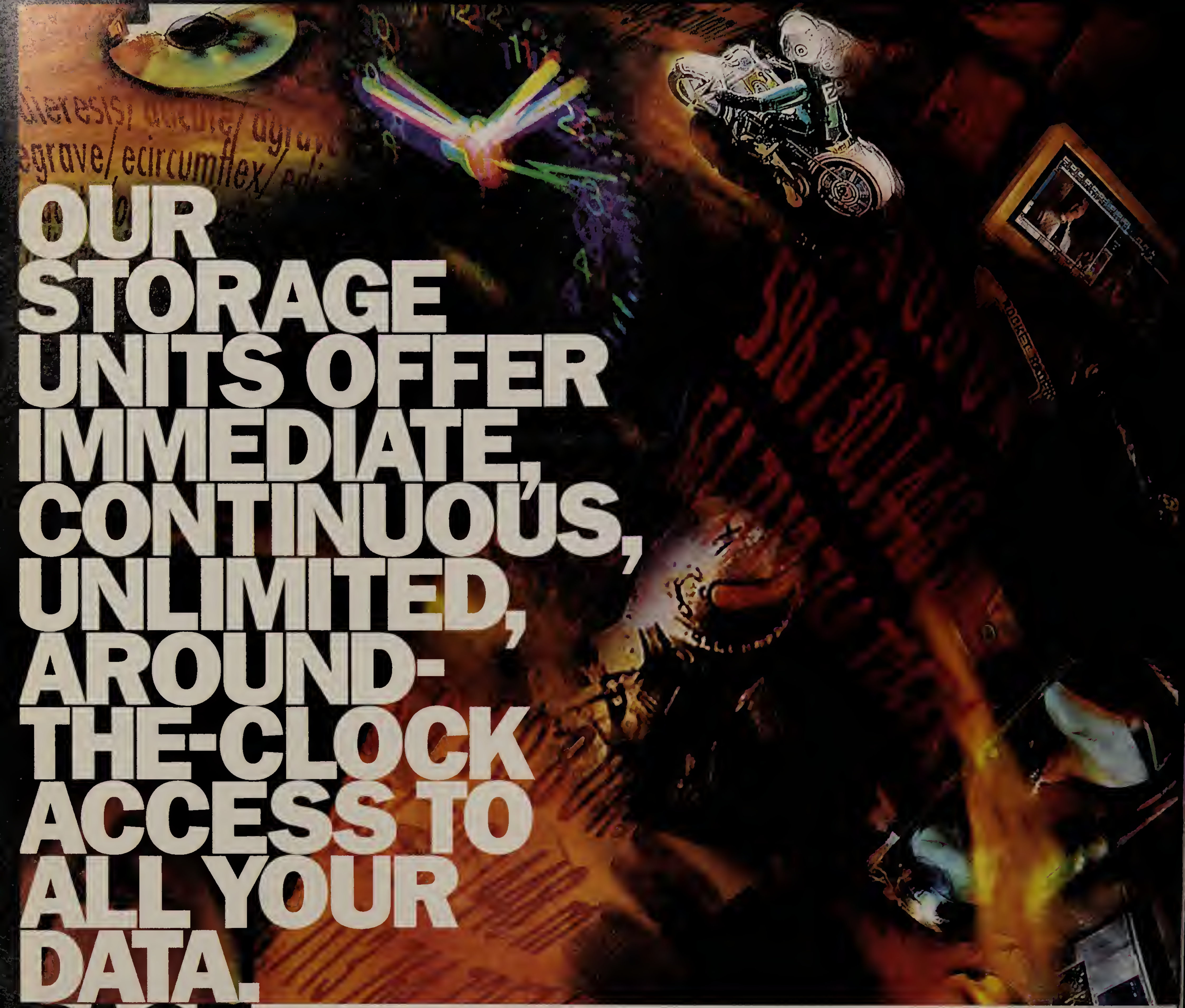
SQA Version 4.0 could run on Windows NT but did not offer full graphics support, said Tim Gerrells, a quality assurance test engineer with the Denver-based software company. "Version 5.0 also supports some unique 32-bit controls — for example a [navigational] 'tree' control," he said.

The new Sybase repository was a key factor in persuading Geographix to adopt SQA as its standard test tool.

"The database repository that SQA offers is much more scalable and stable [than that found in rival products]," Gerrells said.

Available now, SQA Suite 5.0 starts at $2,995 per user.

©SQA: (617) 939-3000.



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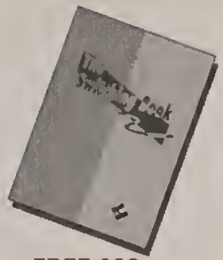

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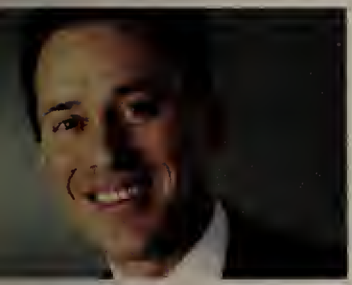
company's management decided that the reason for the crushing defeat had to be found.

A Continuous Measurable Improvement team was set up to investigate the problem and to recommend appropriate corrective action. The conclusion: The problem was that the Japanese team had eight people rowing and one person steering, while the American team had one person rowing and eight people steering.



Marc Myers

The American team hired a consultant who suggested totally reorganizing management to include four steering managers, three area steering managers, one staff steering manager, and a new automated performance analysis system to provide greater incentive for the rower to pull harder.

The next year, the Japanese quickly took an early lead in the race and won by almost two miles.

Humiliated, the American aerospace company laid off the rower for poor performance, sold the oars, halted development of a new boat, gave an award to the consulting firm and then distributed the money saved to senior executives as bonuses.

The moral is: The winning team is not the one with a rigorous quality process in place, but rather the team with a well-designed quality process in place.

For many companies, arriving at a well-designed software development quality process is synonymous with the implementation of an ISO 9000 quality strategy and eventual ISO 9000 certification.

But just what is ISO 9000 certification? According to Dogbert, of "Dilbert" cartoon fame, it requires passing an ISO 9000 audit, which is, of course, true. Dogbert, the auditor, explains, "Basically, you give me money and I tell you that you're a bunch of dolts."

This may also be true but certainly, the independent ISO 9000 auditor has become an object of fear and trepidation among companies seeking certification.

ISO 9000 is a standard for quality prod-

rly ingenious about is that the set of qual- dhered to is actually h by each company . Using the ISO man- ich company custom- assurance processes. andates that a com- here to appropriate ncluding consistent ion.

In other words, if you want ISO 9000, go get a qualified consultant to help you out. That's what Sybase, Inc. did. The company recently completed its ISO 9000 certification in less than one year.

Myers is president of Client/Server Connection, Ltd., a Cambridge, Mass., firm specializing in client/server software solutions. He can be reached at (800) 622-1108, Ext. 522, or via CompuServe at 71332,1726.

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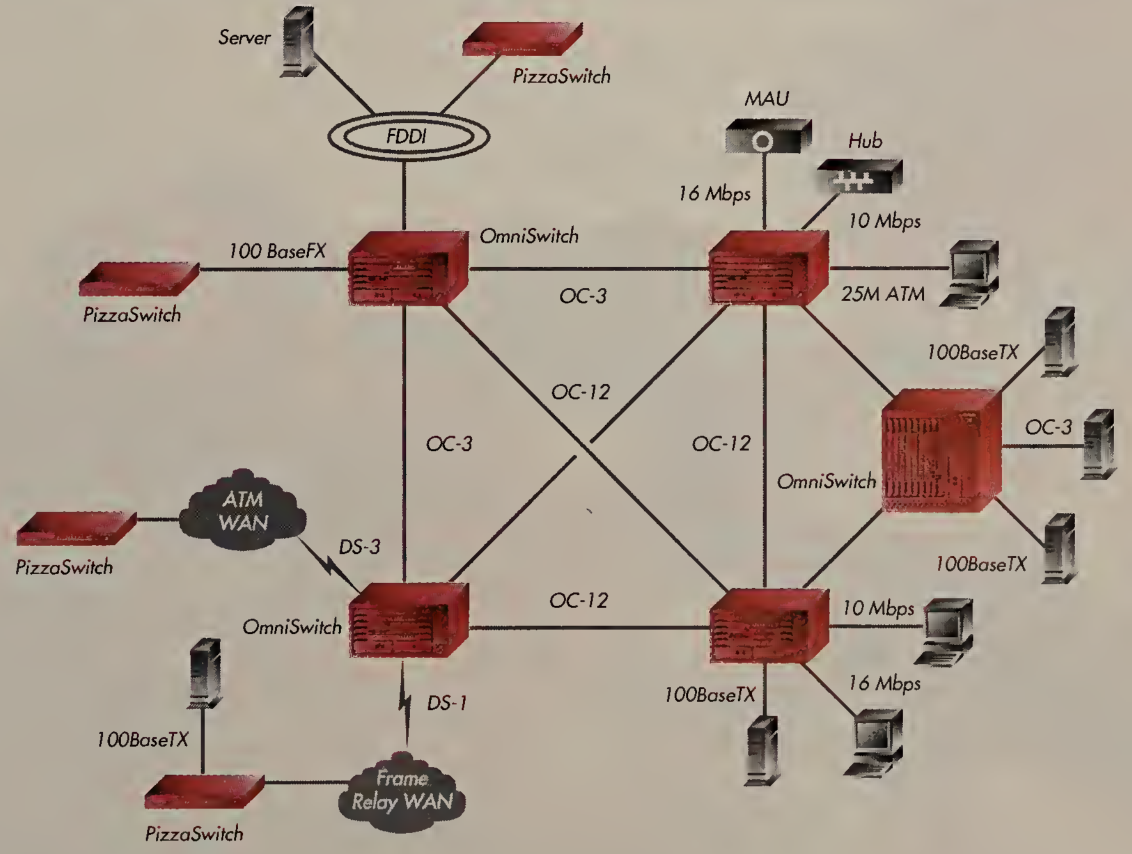

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Intranets & the 'Net

Covering: Internet Technologies and Services
for Collaboration and Electronic Commerce

Briefs

Internet Security Systems, Inc.'s *scanning tool for assessing* **network vulnerabilities** *has been redesigned. The latest version has a graphical user interface that displays a color-coded map of an organization's network devices.*

Internet Scanner 3.3, which simulates network attacks to identify security holes, also now includes a brute force attack against Cisco firewalls and POP3 mail-delivery services, and checks for network information services weaknesses that hackers exploit to execute unauthorized programs on NIS servers.

Internet Security Systems: (404) 252-7270.

Cupertino, Calif.-based start-up **Portal Information Network** *is developing a large-scale* **payment and billing system** *called Infranet for use by Internet service providers or large organizations engaged in electronic commerce on the Internet.*

Portal: (408) 343-4400.

SpaceWorks, Inc., *which markets online* **order-entry** *software accessed through direct-dial lines, now has a version that works over the World-Wide Web with a standard browser.*

SpaceWorks: (301) 251-4136.

Northern Telecom, Inc. *intends to make a line of* **screen-based telephones** *and wireless devices for consumers and businesses based on the Network Computer specification. Nortel will add Java to its existing PowerTouch screen phones this summer, and trials of wireless products will begin next year.*

CompuServe, Inc. *said the Federal Election Commission (FEC) has rejected its request to be allowed to offer* **free Internet,** *Web and information services access to federal political candidates during the election year. The FEC has decided candidates cannot accept free offers of 'Net access, CompuServe said.*

Chemical giant mixes search engine and Web

By Ellen Messmer
Philadelphia

Chemical manufacturing giant Rohm & Haas Co. has formed a global corporate intranet on its private T-1 network that blends Web servers and an HTML search engine.

As a result, roughly 3,800 engineers and marketing, finance and human resources personnel can now locate and retrieve information published on 57 Web servers using a browser. The internal search engine does its part as well, scouring the network to build a database of Rohm & Haas intranet documents.

The Rohm & Haas Co. global intranet

Headquarters: Philadelphia
Annual sales: $3.9 billion
Type of network: Private global T-1 network
No. of intranet Web servers: 57
No. of corporate Webmasters: 30
No. of employees with Web browsers: 3,400; expected to reach 8,000 by year-end.

Rohm and Haas Co.'s primary businesses include paint additives, building products, industrial and home cleaners, plastics, and electronic, agricultural and petroleum chemicals. It has research, manufacturing and sales facilities in the U.S., Canada, South America, Asia and Europe.

The number of employees armed with Web browsers at Rohm & Haas is expected to grow to 8,000 later this year. Although everyone is allowed past the corporate firewall to troll the public Internet, the outside world is not permitted onto the intranet.

Switch for free?

The company has settled on Netscape Communications Corp.'s Navigator as its corporate browser. However, Microsoft Corp.'s strategy of giving away browsers and bundling its Web server into NT has the MIS department considering a switch to its Explorer browser, said Tom Pierce, senior scientist in the Rohm & Haas computing research technologies section and one of the company's 35 Webmasters.

About half of Rohm & Haas plans to move to NT.

However, the company retains a diverse computing environment that includes Novell, Inc.'s NetWare; Digital Equipment Corp.'s Pathworks; IBM mainframes; PCs; Apple Computer, Inc.'s Macintoshes; Unix workstations; NT; and Ethernet and token-ring LANs.

Because of this diversity, Rohm & Haas is using Web servers from at least a dozen vendors, including Novell, IBM, Oracle Corp., and Netscape, as well as National Center for Supercomputing Applications freeware.

"The servers are becoming specialized, particularly in the Common Gateway Interface scripts, and you don't swap out one for another," Pierce noted.

Client/server apps out?

The intranet that Rohm & Haas began building 18 months ago is also driving its migration to client/server systems and away from an IBM VM PROFS system. The company is installing Dataware Technologies, Inc.'s NetAnswer software to convert IBM mainframe data into HTML format.

And the Web-based intranet's growth is also pushing out previous client/server systems at Rohm & Haas, such as the one specialized for chemical information sheets. The company replaced it with the Web, which is easier to maintain.

The corporate phone directory immediately went up on HTML, said Pierce, whereas proprietary client/server directory software "never made it out of evaluation."

To help Web users find what they need, Rohm & Haas has been running the Harvest Information Discovery and Access System search engine developed by the University of Colorado.

The Harvest search engine pulls down whole HTML, binary and image documents from remote databases on the corporate net and performs a full-text scan of them to allow for a keyword search of content, said Pierce.

Harvest can also be instructed to replicate Internet Web servers. Rohm & Haas uses this feature to duplicate the public Rensselaer Polytechnic Institute chemical Web server for its intranet use.

Learn more about Harvest servers on Network World Fusion. Select News+ then Intranets & the 'Net.

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The lion's share of what is published on the Rohm & Haas intranet is information freely shared by everyone across the enterprise.

But many divisions now want to put up more sensitive data on the intranet so that it can be shared on a limited basis. This demand is forcing the technical staff to try and figure out a Web security model to augment the older mainframe security log-on procedures.

So far, no definitive Web security approach has been decided upon, said Linda Kwochko, document management support specialist.

"The security issue is difficult, and we may have to keep a table for each page on the intranet," she said. "But it will need to be secure because business units are very protective of their data." ■

Electronic commerce

Fruit of the Loom stitches Web service for distributors

By John Robinson

A clothing company is applying the same style of custom fit, support and sizing to its online presence in an effort to increase and ease the distribution of its products.

Fruit of the Loom, Inc. is developing a Web-based ordering system for 50 distributors of its Activewear product line. Each distributor will be provided with a custom Web site to enable its customers — primarily silk-screen printers, embroiderers and garment decorators — to review inventory online, check availability and prices, and order products around the clock.

Snickelways Interactive, a New York-based digital marketing company, is developing the interface for the Activewear Online application and constructing the Web sites, which will be hosted by Connect, Inc., an Internet service provider and server farm in Mountain View, Calif.

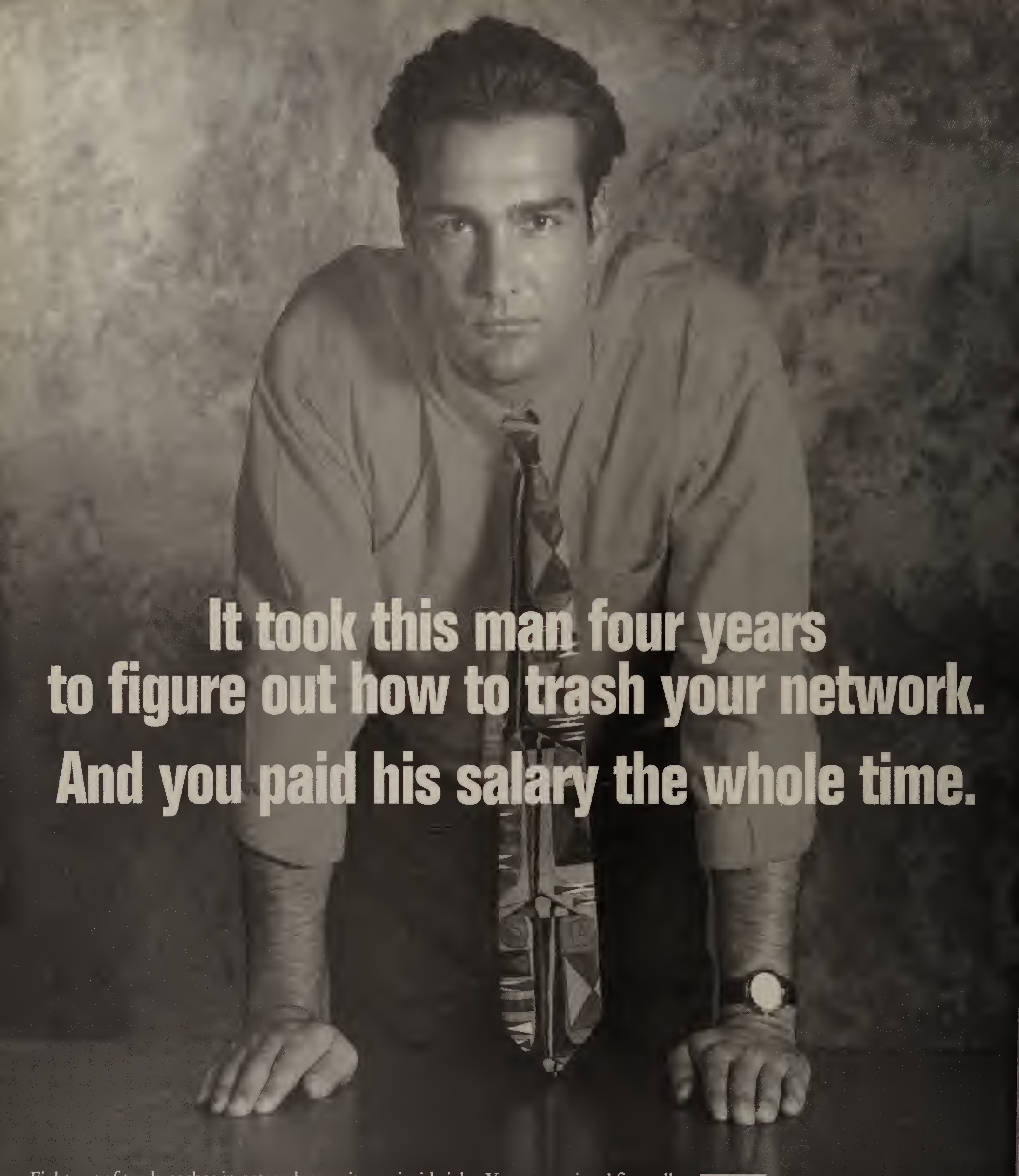
According to Snickelways, focusing on information exhange and de-emphasizing financial transactions allowed them to meet Fruit of the Loom's needs.

"While everyone else is struggling to put up something transactional and worrying about credit card numbers, we have focused on communication and other end-user benefits," said Andy Howarth, president of Snickelways Interactive. The distributors will continue to use whatever billing systems they had in place with their customers, he added.

The 50 Web sites will be functionally equivalent, but the actual functions and appearance can be tailored to meet the needs and tastes of each distributor, Howarth said. Once the sites are constructed, distributors can use Snickelways' Digital Cockpit tool to evaluate traffic patterns and sales, post promotions and monitor chat rooms.

"This is really an advantage for the distributors," said Pat Flynn, vice president of systems development for Fruit of the Loom. "They can look as big as Levi does on the Web, and customize their own [Web sites] without investing in the tools or worrying about hosting the site."

©Snickelways: (212) 675-6030.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Occasionally, readers write to pass along knowledge they have gained in solving a problem. Here's such a case.

Recently, Michael Herald, a systems analyst for TeleQuest Teleservices of Arlington, Texas, told us that changing a subtle, undocumented software setting on his CrossComm Corp. routers resolved intermittent outages he was experiencing.

His company uses a CrossComm XL20 with an XLP routing module and a CrossComm ESwitch at headquarters, and XL10s with XLP modules and ESwitches at both of its remote sites. Roughly every 20 minutes, its Novell, Inc. NetWare 4.1 devices at each site stopped responding to the network.

CrossComm helped Herald understand that the problem was a software setting on the ESwitch. The ESwitch is not connected to the XLP module over the backplane. Instead, CrossComm uses a daisy chain connection from a port on the XLP module to a port on the ESwitch.

The port on the ESwitch needs to be in backbone mode, not the default workgroup mode that it is in when sent from the factory. This subtle difference was not explained in the documentation provided with the equipment, according to Herald. Once he changed the setting, he fixed the problem rather quickly.

If you have similar experiencces to share, post a message to our Fusion Help Desk Conference at http://www.nwfusion.com. Select Forums then Help Desk.

Be helpful

While you're in the Help Desk conference, come to the aid of your peers. In Topic 55, a user describes a problem that has been puzzling him and his vendor's technical support staff.

After installing and setting up a Network File System client using FTP Software, Inc.'s Interdrive on a system running Banyan Systems, Inc.'s VINES 5.54, he's gotten a spool32 crash. If you have any clues as to why this is happening, let him know.

ADSL delivers advanced services over basic copper telephone lines

By Debbie Sallee

For mass deployment of interactive multimedia services to become a reality, today's networks must deliver greater throughput. Asymmetric Digital Subscriber Line (ADSL), a recently approved ANSI standard, provides an answer. ADSL technology can literally transform the existing public information network from one limited to voice, text and low-resolution graphics to a system capable of bringing simultaneous switched digital video and other advanced, interactive services to everyone's office or home.

With ADSL, a noncompressed 900K-byte file that includes a color image can be downloaded at a rate of 3.6M bit/sec in two seconds. What's more, ADSL offers 640K bit/sec bidirectional capability that can accommodate videoconferences and full-motion video.

ADSL in practice

By adding ADSL modems to each end of a twisted-pair telephone line, telephone service providers can split that line into a downstream channel that ranges in speed from 1.5M to 6.1M bit/sec, a duplex channel that ranges in speeds from 16K to 640K bit/sec and a plain old telephone service (POTS) channel. The latter is split off from the digital modems by filters, thus guaranteeing uninterrupted POTS.

Each channel can be submultiplexed to form multiple, lower rate channels. ADSL technology supports up to seven synchronous channels that can be configured to meet application requirements. ADSL transmission equipment vendors use either frequency division multiplexing or echo cancellation to achieve this huge gain in throughput.

The applications for ADSL include Internet and remote LAN access, video on demand, CD-ROM links and a multitude of multimedia services, such as video real estate listings, distance learning, videoconferencing, interactive advertising and interactive shopping.

An office receiving ADSL-based services could simultaneously be running up to four movies stored in MPEG 1 format and transmitted at 1.5M bit/sec on separate televisions while holding a videoconference operating at 384K bit/sec and downloading data files from a server via a 128K bit/sec ISDN link. And if that's not enough, it could answer a telephone call from a customer without disturbing the other activities.

ADSL benefits

ADSL's Discrete Multitone line code lets telephone companies provide customers with the maximum data throughput attainable to within 32K bit/sec in any given noise environment. By fitting the data rate to the phone line's capacity, an ADSL adaptive rate modem can provide the best performance possible from every residential or business telephone line.

For network managers, ADSL provides a cost-effective way to meet the high bandwidth needs of telecommuters. This is a growing area of concern: The group Telecommute America recently reported that two-thirds of Fortune 1000 companies have a telecommuting program and 60% of those companies that do not currently employ one say they will institute a plan within the next three years.

To enhance the productivity of telecommuters, companies need to give them quick, two-way access to data and other types of information. As the above example points out, a home office worker receiving ADSL-based services could simultaneously tap into the corporate server, hold a meeting via video phone and field an important call from a prospect. This stands in marked contrast to the telecommuter who throws a load of laundry in while waiting for the supervisor's weekly report to download onto his home system.

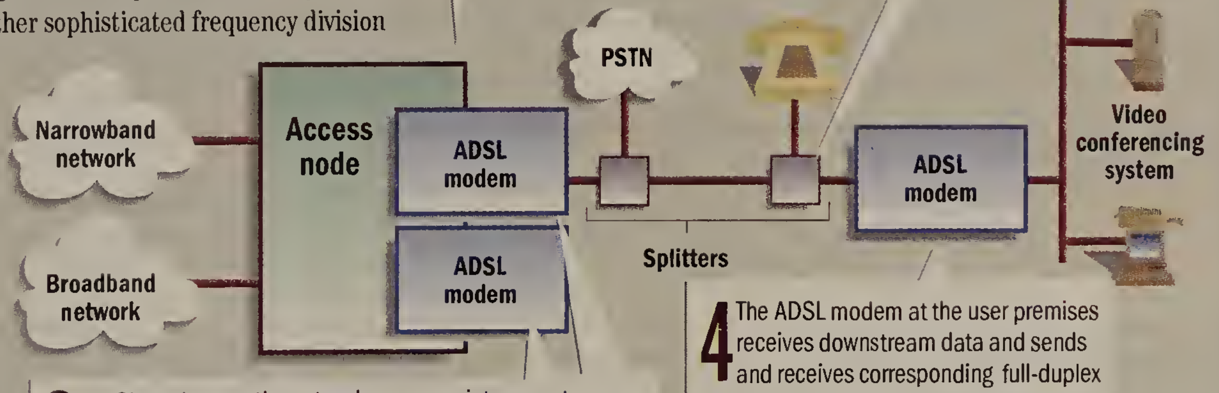
ADSL modems have been tested successfully by as many as 30 vendors, and telephone companies have installed tens of thousands of lines in various technology and market trials in North America and Europe. While early testing experimented with ADSL for video on demand, current trials are focusing on quick deployment of 'Net and remote LAN access. Full-scale deployment is expected between now and mid-1997.

Sallee is business development manager for Motorola Semiconductor Products Sector's ADSL Program in Phoenix. She has been instrumental in creating the ADSL Forum, for which she now serves as a director. For more information, contact Motorola at rdjj90@email.mot.com.

UP CLOSE

ADSL infrastructure

ADSL service supports basic voice and advanced interactive data and video services over regular phone lines. ADSL modems divide those lines into multiple high- and low-speed channels by using either sophisticated frequency division



1 The carrier node concentrates broadband and narrowband data.

2 ADSL modems at the network access point support one or more downstream high-speed channels, operating from 1.5M to 6M bit/sec, and one or more full-duplex channels, operating from 16K to 640K bit/sec.

3 Splitters separate high-frequency ADSL signals from low-frequency POTS signals, which get sent into the PSTN, at the central office and user premises.

4 The ADSL modem at the user premises receives downstream data and sends and receives corresponding full-duplex data. It can have a variety of digital interfaces, such as the Ethernet connection shown here.

NetworkWorld Fusion

Jump to Network World Fusion and get more information on ADSL technology. Select NetRef, Technology Resources then WAN Services.
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Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Beth Schultz by phone at (312) 283-0213 or via the Internet at bschultz@nww.com.

EDITORIAL INSIGHTS

Train in vain

On-line Obstacles: Software, training issues delay implementation of town's new computer system
— *The Ashland Tab*, May 7, 1996

There it was in the lead headline of the weekly tabloid serving my sleepy hometown of Ashland, Mass.: Nothing less than a metaphor for our experience here and at companies across the world struggling to catch up, keep up and thrive in this networked world.

Two years ago, Ashland budgeted $180,000 — a tidy sum in suburbia — for a client/server computing system to serve town departments. But the project has gotten off track and Ashland is slipping behind neighboring towns largely because, critics say, the town saved money by skimping on training.

Well, the only difference between Ashland's leaders and the rest of us is that, as elected or appointed officials, they can be called on the carpet publicly for something we're all guilty of: trying to be technology leaders without ponying up for training.

If there is a constant in the success stories we cover, it's training. Where there is trouble, lack of training looms large. Technology goes unused, unaccepted or underemployed because people don't know what they're supposed to do with it.

More than likely, your employees are already stratified into three different classes of systems literacy. There are workers with a techno-gleam in the eye who dive in and learn all the nuances of your expensive applications. There are others who really want to learn, but don't have the knack for figuring this stuff out. A third group doesn't care and adopts a passive, maybe even active, resistance to your shiny new tools.

As a result, one- to two-thirds of your investment is being wasted — perhaps even more, because it is employees in those latter groups who could benefit most from your technology investments.

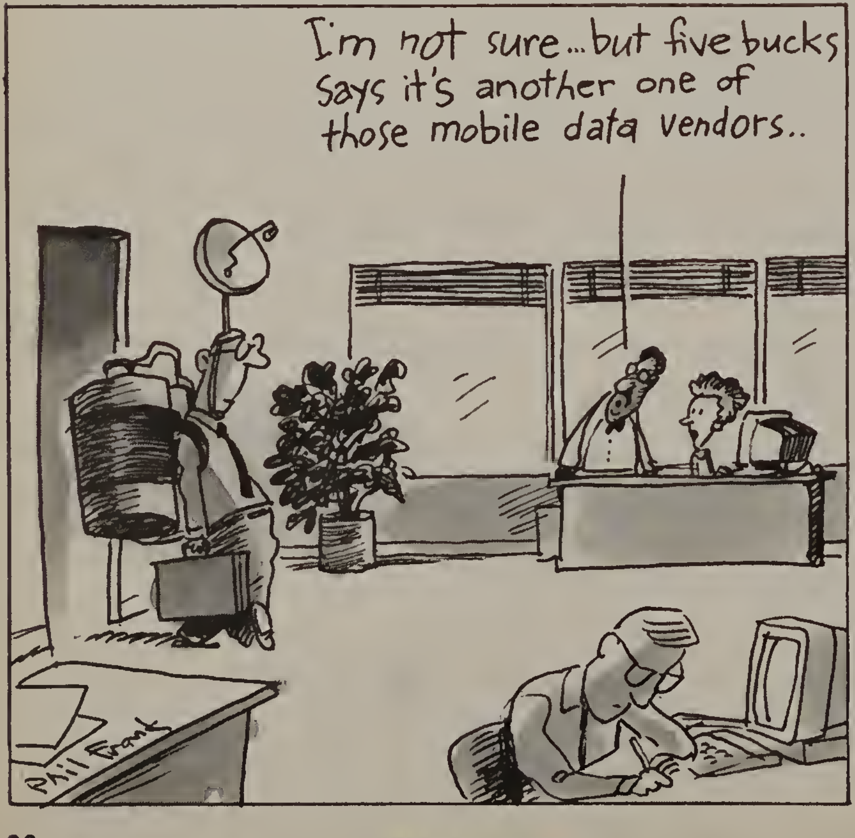
With leaner staffs, more technology on our plates and tighter budgets, how do we solve this training riddle? Our IT staff, like yours, has little time to train employees, and outside training can only take you so far. Besides, you still have to pay for it.

So, how are you solving this training conundrum? Share your advice with us. I know I could sure use it.

John Gallant, editor in chief jgallant@nww.com

Teletoons

By Phil Frank and Joe Troise
baba@sfgate.com


I'm not sure...but five bucks says it's another one of those mobile data vendors..
Phil Frank

REALITY CHECK

Problems gripping small ISPs may spell trouble for the Internet of the future

Thomas Nolle

We all know that the Internet is the most exciting thing to happen to networking in this decade. We know that it is growing at an astonishing rate. We know it educates millions, entertains even more and is important enough to be a worthy target of congressional interest.

With all this going for it, you'd think the Internet is a sure thing. It isn't. The Internet we all see is really a collection of Internet service providers, and the ISPs are in trouble.

When the Internet was first becoming popular about four years ago, ISPs told us that they could often support 300 or more subscribers — most of whom used the 'Net simply to send and retrieve E-mail — on a single port. It's not surprising that a lot of ISPs got their start during this period. Today, an ISP is lucky to support 150 subscribers per port, and those users who dial in may stay online for hours surfing the 'Net.

This might have been tolerable in the good old days, when ISPs could charge an hourly rate for all usage over a monthly base service level. AT&T's entry into the Internet market has pretty well killed off that style of billing. So today, ISPs face a situation in which users stay online longer, running up access costs, but can't be charged more for doing so.

Small ISPs face problems other than network costs. The most credible place to advertise for Internet access is in technology publications, which are national in scope.

The small ISP, which normally serves a limited geographical area, must choose between advertising in a magazine that reaches thousands of people outside the ISP's service area (at a premium ad price, of course) or advertising in a regional publication that doesn't have clout with the buyer.

Maybe the solution to the problem of Internet access cost and price is to shift the burden from the consumer to the information provider. Make those who benefit from advertising — the advertisers — pay.

Regionalization hurts small ISPs in another way. More and more of us take computers on the road and expect to dial in to retrieve E-mail no matter where we are. A small ISP must either provide an 800 number — the per-minute charges for which are increasingly difficult to pass along to the user — or expect the subscriber to pay long-distance charges. Since users don't want to pay those charges, ISPs eat part or all of the cost of the 800 number.

When prices fall and costs rise, the inevitable result is mass corporate sinkings. Some ISPs have already lost second-round venture financing or canceled initial public offerings. More will surely face the same fate, suffering the fatal results of underfinancing. Estimates of the number of ISPs vary, but most industry observers peg the count at about 2,500. Most observers also agree that fewer than 20% of these ISPs can survive under the present cost/price conditions.

What is the solution to the ISPs' problems, and what will happen if these problems aren't solved?

Mergers and acquisitions may be the answer. UUNET Technologies, Inc., the largest of the ISPs, was recently acquired by competitive access provider MFS Communications Company, Inc. Like almost everything else in telecommunications, Internet access is subject to economies of scale. Buyouts build the mass of the larger ISPs, making them more credible and enabling them to build more economical networks. Getting bought by a company such as MFS, which owns transport resources, also cuts an ISP's network costs.

Another solution is being tried by Concentric Network Corp. (CNC), an ISP with national scope but known primarily on the West Coast. CNC has teamed up with a central office switch provider, Sattel Communications, to marry switches and modem banks as a way of reducing access costs. CNC and Sattel are hoping for big cost reductions, enough to at least stabilize the cost/price pressures on those ISPs with the funds to deploy the equipment.

But will that be enough? Can firms such as AT&T drive Internet access prices so low that competition is impossible?

In fact, AT&T may simply be demonstrating a basic contradiction in the Internet: Subscribers pay for services that often benefit those who publish information — information that is often advertising. You couldn't read this column in this magazine unless advertisers financed the space, yet you are expected to pay for access to what is increasingly becoming advertising on the Internet.

Maybe the solution to the problem of Internet access cost and price is to shift the burden from the consumer to the information provider. Make those who benefit from advertising — the advertisers — pay.

That brings us to what happens if ISP problems aren't solved. Many small ISPs will be sunk or bought. What will happen then to the innovation that has sparked the growth of the Internet? Will big facilities-based carriers such as AT&T be as innovative and risk-taking? Will a few big ISPs sit back and rake in the bucks, where many small ones would have experimented with new services, new features and maybe promoted new uses of the 'Net?

The fact is that we don't know, but we're betting the future of the Internet on the assumption that we can build quality of content while trying to build economy of scale.

Competition breeds innovation, and that may mean that fewer competitors isn't a good thing. We liked mom-and-pop farms; how do we feel about mom-and-pop ISPs? We'd better figure that one out while there are still some to save.

Nolle is president of CIMI Corp., a technology assessment firm located in Voorhees, N.J. He can be reached at (609) 753-0004 or via the Internet at tnolle@ix.netcom.com.

MIER'S NETCETERA

A quick quiz to determine your LAN switch IQ

Edwin Mier

You say you're sick and tired of routers? You say you've had it with keeping track of a hundred different network protocols — for your NetWare users, for Internet traffic, for SNA encapsulation, etc.? You say there's got to be a better way?

Well, there is. Welcome to SwitchLand — a new marketing, er, public service concept that combines brainwash, er, network technology education with the first ever LAN switch factory outlet. Come in, come in. Have a seat.

Yes, friends, switching — recently nominated as buzzword of the year by the Institute for the Advancement of Network Hyperbole. You, too, can bring your network out of the dark ages and up to date with this revolutionary new network technology.

Just imagine: No more configuration problems. Unlimited throughput. No more worries about the Border Gateway Protocol, Novell Router Information Protocol and DECnet Routing Protocol. No more bottlenecks. Before you know it, your network's running like a well-greased '74 Chevy Nova.

Sound too good to be true? Well, we here at SwitchLand want you to switch with confidence.

We've designed a short quiz to help you determine whether switching is what your network needs. So take just a minute to select the correct answer to each of these five questions:

1. The biggest difference between LAN switches and other internetworking devices is:

a. Switches don't get bogged down with all the protocol details of bridges and routers. They just switch data to the right place, automatically and really fast.

b. In most cases, there isn't any real difference between switches and bridges. And some switches even do routing.

c. Huh? I'm sorry; I wasn't listening. Is this where they sell PBXs?

2. When LAN switches get overloaded, what happens?

a. They don't. They move data so fast, they don't have a chance to get clogged up.

b. I suppose they drop packets all over the floor.

c. I dunno. I'm the network manager. I just tell users their applications are responsible for making sure no data is lost.

3. At what network layer do switches operate?

a. Hey, we're talking switches here. They don't need no stinkin' network layers. They just get the job done.

b. Mostly at the data link layer, just like bridges.

c. Beats me. My boss just wants me to buy the latest and greatest technology for our network.

4. What makes switches so fast?

a. It's that cut-through technology.

b. Actually, switches use store-and-forward technology in most cases, just like bridges and routers, so their throughputs are comparable.

c. How should I know? Just tell me who to make out this purchase order to.

5. What's the best reason for ripping out hubs, bridges and routers, and installing switches?

a. There are lots of reasons: virtual LANs, cut-through, performance. One technology can do it all.

b. Switches can replace some hubs, if deployed judiciously. But bridges? Most switches are bridges. And I'd have to take a long, hard look at things before I haul all my routers out to the dumpster and replace 'em with bridges, er, switches.

c. Who cares? Just fill up my truck. I'll be back for more tomorrow.

Okay, let's see how you did.

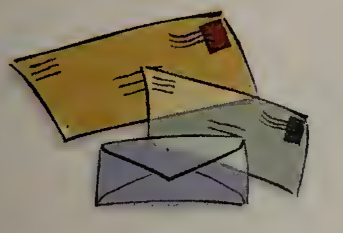
If you answered ''a'' for all the questions, congratulations. You got a perfect score. Now please proceed down the hall to the dark room, have a seat and put on one of the virtual reality helmets. We have a special presentation for you that starts in just a minute.

If you answered ''c,'' well, we thank you for your business. Come again next year.

If you picked ''b'' for any of the answers, please leave quietly by the back door. How'd you get in here anyway? What are you, some kind of antitechnology wacko?

Mier is president of Mier Communications, Inc., a Princeton Junction, N.J.-based network consultancy. He can be reached at (609) 275-7311 or at ed@mier.com.

MESSAGE



QUEUE

The Alliance answers

3Com Corp. takes exception to the coverage you gave our Network Interoperability Alliance (NIA) announcement, under the tabloid-like headline ''Trio gangs up on Cisco'' (May 20, page 1). In an attempt to jump the gun, you did not perform the thorough and balanced research expected of a publication like *Network World*.

We would like to clarify the NIA's objectives and inform your readers of the following points.

First, the NIA is not a closed or exclusive group. Any vendor that endorses the architectural concepts laid out in the NIA white paper, and is prepared to make the same commitments to open protocols and interoperability that IBM, Bay Networks, Inc. and 3Com have made, may join the NIA. This statement certainly applies to vendors such as Cisco Systems, Inc., Cabletron Systems, Inc. and others with which we compete in the marketplace.

Second, the article emphasizes that the NIA falls short on ''specific plans for new standards.'' This reveals another fundamental misunderstanding. The NIA is *not* a new standards body. Confusing the notion of standards and interoperability is a dangerous mistake in our industry. Please do not help to propagate this confusion.

Third, the article mentions market share figures that are incomplete and out of context. According to the most recent reports published by International Data Corp., no other three companies in the world have connected more desktops or servers, and installed more hub ports or switch ports, than IBM, Bay and 3Com. We feel our customers form a large enough share of the market that their voices should be heard.

Fourth, your readers should know that you did not speak to any of the NIA's spokespeople when you chose to print this story. You traded off more complete and balanced coverage in favor of time to market. In the network equipment industry, trading off a balanced feature set and quality in favor of time to market is a bad bet.

Finally, your readers should know that on May 20 we held a bicoastal press conference on the NIA launch, at which virtually every trade publication was represented except *Network World*. This would have been an excellent opportunity for you to hear an alternative point of view to the one you presented.

Eric Benhamou
Chairman and CEO
3Com Corp.
Santa Clara, Calif.

Editor's response: Network World *learned of this announcement shortly before going to press and responded quickly to break this important news. We feel the article was a balanced representation of the NIA's goals and the views of others — customers, analysts, rivals — in the industry.*

See **Message queue,** *page 72*

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HOW TO SECURE YOU

WITHOUT ISOLATING YOURSEL

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There was a time when network security simply meant overseeing your own private realm of information.

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CheckPoint FireWall-1 is continually receiving top honors from the industry's toughest product reviewers and testers.

Introducing the next generation of network security, and not a moment too soon. CheckPoint FireWall-1.™ Based on an entirely new architecture called Stateful Inspection technology, FireWall-1 gives you what traditional firewalls simply can't offer — true global secure connectivity.

Platform Support	Unmatched Application Support	Virtual Private Network Solution	Fully Configurable Remote Users	Distributed Management
• SUN SPARC™ based systems • Intel x86 or pentium • HP PA 700/800 • MS NT™	• Over 120 predefined • First to support new applications — e.g. RealAudio, VDOLive, SQL*Net • Easy point & click creation of new services	• Fully integrated selective encryption • Integrated key management • Transparent to users	• User Authentication • Client Encryption for mobile users	• Single security policy enterprise wide • Manage multiple firewall's simultaneously • Platform independent management • Real-time logging, tracking & auditing

Nobody supports a wider variety of the applications, services and capabilities you need.

It's not packet filtering. It's not an application gateway. Stateful Inspection does more than just restrict what you don't want. It enables what you do. By supporting hundreds of applications, CheckPoint FireWall-1 meets your present and future needs. It lets you manage a single security policy across diverse platforms, over dozens of firewalls, local or remote, from a single location.

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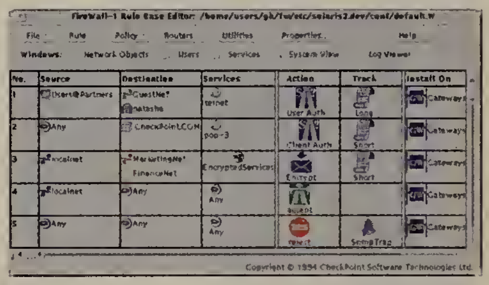

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And with Stateful Inspection technology from CheckPoint FireWall-1 you have the security system you need, not only to enter that world, but to conquer it.

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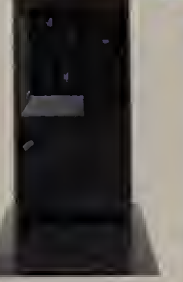

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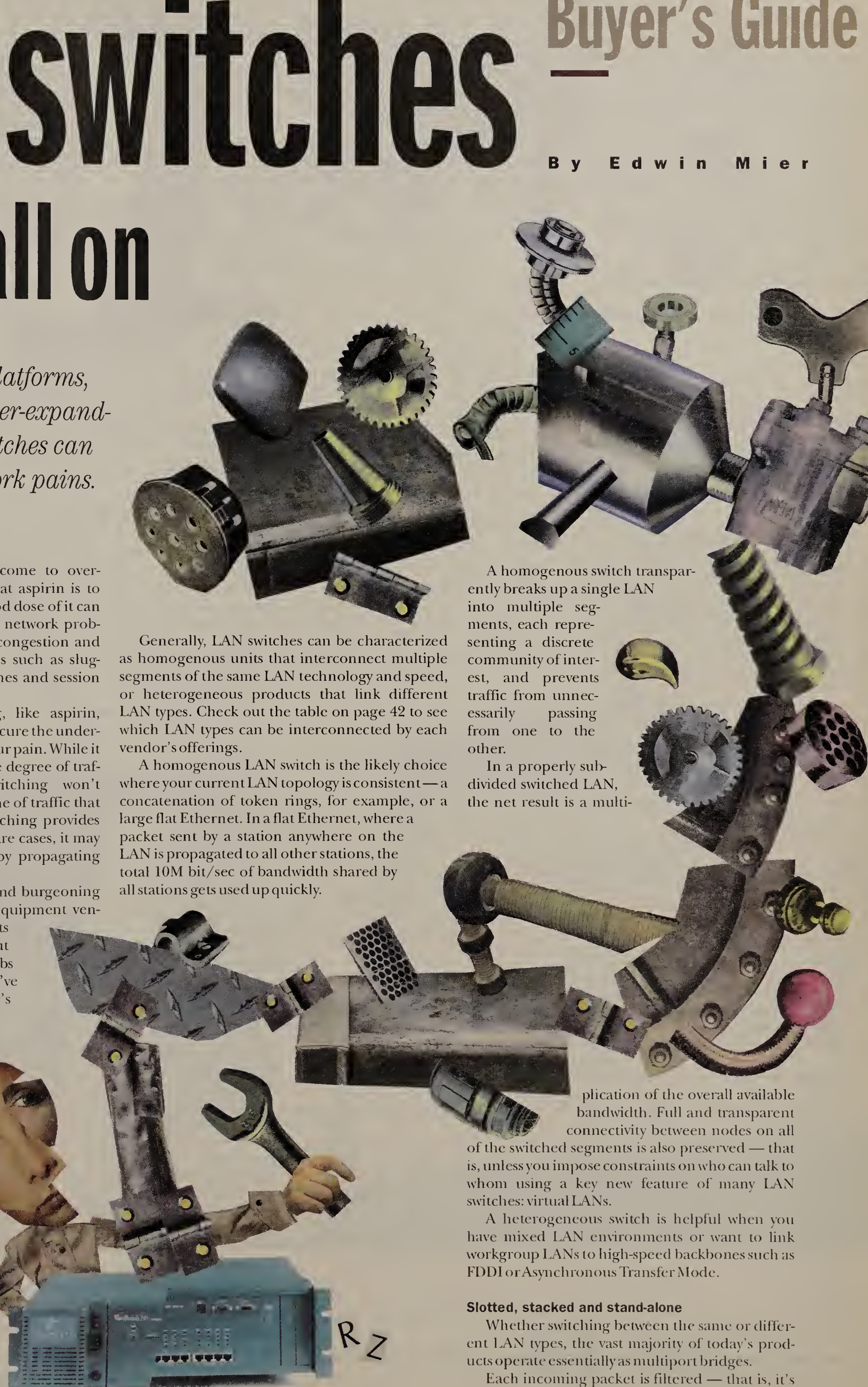
Buyer's Guide

LAN switches take it all on

By Edwin Mier

With support for new platforms, LAN topologies and an ever-expanding feature-set, LAN switches can ease more of your network pains.



ROB ZAMMARCHI

Switching has become to overloaded LANs what aspirin is to headaches: A good dose of it can often treat some network problems — namely congestion and related symptoms such as sluggish response times and session time-outs.

But switching, like aspirin, won't necessarily cure the underlying causes of your pain. While it will provide some degree of traffic control, switching won't reduce the volume of traffic that users generate. Or the relief switching provides may only be temporary. In a few rare cases, it may even exacerbate your problems by propagating bad packets.

Still, LAN switching is a brisk and burgeoning market. Virtually every network equipment vendor has embraced it with products marketed not just as switches, but switching routers, switching hubs and the like — all of which we've attempted to include in this Buyer's Guide.

And vendors keep bolting new features onto their products and adding support for newer LAN types. For example, LAN switches are becoming increasingly modular and support different switching technologies that let you reconfigure them for linking the same LAN type or mixed LAN topologies.

Where does it hurt?

One of the first steps in LAN switch shopping is figuring where in your network it can be deployed to ease the most pain.

Generally, LAN switches can be characterized as homogenous units that interconnect multiple segments of the same LAN technology and speed, or heterogeneous products that link different LAN types. Check out the table on page 42 to see which LAN types can be interconnected by each vendor's offerings.

A homogenous LAN switch is the likely choice where your current LAN topology is consistent — a concatenation of token rings, for example, or a large flat Ethernet. In a flat Ethernet, where a packet sent by a station anywhere on the LAN is propagated to all other stations, the total 10M bit/sec of bandwidth shared by all stations gets used up quickly.

A homogenous switch transparently breaks up a single LAN into multiple segments, each representing a discrete community of interest, and prevents traffic from unnecessarily passing from one to the other.

In a properly subdivided switched LAN, the net result is a multiplication of the overall available bandwidth. Full and transparent connectivity between nodes on all of the switched segments is also preserved — that is, unless you impose constraints on who can talk to whom using a key new feature of many LAN switches: virtual LANs.

A heterogeneous switch is helpful when you have mixed LAN environments or want to link workgroup LANs to high-speed backbones such as FDDI or Asynchronous Transfer Mode.

Slotted, stacked and stand-alone

Whether switching between the same or different LAN types, the vast majority of today's products operate essentially as multiport bridges.

Each incoming packet is filtered — that is, it's examined for certain link layer information, typically the source and destination media access control addresses. Based on an address table lookup, the switch decides whether the packet needs to be forwarded and, if so, on which outgoing port.

Aside from this basic operational commonality, LAN switches vary considerably in configuration, performance, price and features.

Most LAN switches come as standalone systems with their own power supplies. Some vendors, such as Digital Equipment Corp., have cleverly packaged their switches so they can be deployed separately or be plugged into a multislot chassis.

Using a multislot chassis usually means you can aggregate switch modules into a larger overall switching system, usually with all modules sharing a power supply. In addition, depending on the vendor's design, it may be possible to remotely access, manage and control multiple switch modules as a single logical device.

AN INDEX OF VENDORS BY LAN TYPES SWITCHED

	LAN types interconnected via switching													
Vendor	Ethernet segments	Ethernet and 100Base-T	Ethernet and FDDI	Ethernet and ATM	Ethernet and token ring	Token-ring segments	Token ring and 100Base-T	Token ring and FDDI	Token ring and ATM	100Base-T segments	100Base-T and ATM	100Base-T and FDDI	FDDI segments	FDDI and ATM
Accton Technology	•	•								•				
Agile Networks	•			•										
Alcatel Data Networks	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Allied Telesyn	•	•		•										
Andrew					P	•			•					
Asante Technologies	•	•	•							•				
Ascom Timeplex	•		•	•	•	•		•	•				•	•
Bay	•	•	•	•		•				•				
Cabletron	•	•	•	•	•	•	•	•	P	•	•	•	•	•
Cisco	•	•	•	•						•	•	•	•	•
CNet Technology	•	•								•				
Compaq	•	•	•							•				
Cray Communications	•	•								•				
CrossComm	•	•		•						•	•			
D-Link Systems	•	•												
Decision Data	•	•	•			•				•				
Develcon	•	•												
Digi International	•													
Digital	•		•	•	•								•	
Fibronics	•	•	•	•										
Fore	•	•	•	•						•	•	•	•	•
Garrett Communications	•													
Hewlett-Packard	•	•	•							•				
IBM	•	•	P	P	•	•		P	P					
Intel										•				
Intellicom	•	•												
LanOptics						•								
Lantronix	•	•								•				
Madge Networks	•			•		•		•	•					
Microdyne	•	•												
NBase Switch Communications	•	•								•				
Network Peripherals	•	•	•							•				
Network Systems	•		•	•	•	•		•	•				•	•
Newbridge Networks	•			•										
Olicom USA						•								
OST	•	•		P							P			
Performance Technologies	•													
Plaintree Systems	•	•	•	•						•	•	•	•	•
Plexcom	•	•	•							•				
Proteon	•	•				•				•				
Retix	•	•												
Standard Microsystems	•													
SysKonnect	•	•	•											
3Com	•	•	•			•		•		P		•	•	
UB Networks	•	•	•	P		•		P	P					
U.S. Robotics	•	•								•				
Whitetree	•			•										
Whittaker/Xyplex	•	•	•	P						•		•		
Xedia	•	•												
XLNT Designs	•	•	•							•		•	•	
Xylan	•	•	•	•	•	•	•	•	•	•	•	•	•	•

P = Planned for later this year.

A dot was given if at least one of the vendor's products supports the configuration, interfaces and throughput to link the specified LANs.

SOURCE: MIER COMMUNICATIONS, PRINCETON JUNCTION, N.J.

Some vendors who have long offered modular, multislot hubs and concentrators, such as Bay Networks, Inc. and UB Networks, Inc., now also offer switch modules for those systems.

A handful of other vendors, including Cisco Systems, Inc., Madge Networks, Inc. and Retix, offer stand-alone switches that can alternately be configured as stackables.

A stack of switch modules offers some of the same advantages as a multislot system, such as aggregation and, in some cases, common management. But you don't have to buy a separate multislot chassis. Of course, you may have to pay separately for one or more stackable-bus connection kits, which serve the same purpose as the backplane bus of a multislot chassis. In some cases, these stackable connection kits can cost as much as a multislot chassis.

Modularity and LAN support

LAN switches also vary considerably with regards to the number and types of LAN ports supported.

With some switches, the number and type of LAN ports is fixed, while with others, they can be readily altered. And in a few cases, such as with UB Networks' GeoRim/E switch, the media interfaces for individual LAN ports can also be changed, between, say, an attachment unit interface, unshielded twisted-pair or coaxial-cable interface.

A quick scan of the Buyer's Guide chart shows that no single LAN switch supports all six types of LANs we asked about: Ethernet, 100Base-T, FDDI, token ring, ATM and 100VG-AnyLAN. That's not really surprising. Few vendors have the development resources or market inclination to support all six on an ongoing basis.

Also, while switching is certainly gaining acceptance in mixed-LAN environments, most users have no more than two or three LAN technologies.

Ethernet dominates within departmental and workgroup LANs. But very few organizations have a lot of Ethernets and token rings in the same general vicinity. Subsequently, the vast majority of LAN switches link multiple Ethernet segments.

While growing in number and popularity, token-ring switches haven't reached the level of acceptance that Ethernet switches have among Ethernet users. For now, token-ring switch prices remain considerably higher on a per-port basis than Ethernet switches.

Switching has advanced quickly in Ethernet environments because it maps well to the transparent type of bridging that's mainly used for interconnecting Ethernet segments. But switching gets complicated with token ring's source route bridging, which involves a broadcast discovery protocol and requires switches to examine more information deeper inside the switched frames. Overcoming this greater technical challenge likely accounts for the late arrival of token-ring switches and their higher price.

Will token-ring switch prices drop? Maybe eventually, but other token-ring components such as network adapters have tended to cost nearly twice as much as their Ethernet counterparts for years.

To get traffic from workgroup to backbone nets, many switch vendors now support the interconnection of Ethernets over FDDI or ATM. Relatively few vendors currently offer support for both of these mixed-LAN topologies, though.

There's also Fast Ethernet — 100Base-T. Due to its close technical ties with Ethernet, 100Base-T is being deployed both as an upgrade to Ethernet, as well as a backbone technology for interconnecting Ethernet workgroups.

Switching between Ethernet and 100Base-T has emerged as the most widely supported mixed-LAN environment. And with the growing popularity of dual-mode interfaces, which can automatically toggle between 10M and 100M bit/sec operations, this is likely to remain a leading switched-LAN environment.

Strategic Networks Consulting and Harvard University Network Device Test Lab have put nearly 40 Ethernet switches through their paces. The key results are on Network World Fusion. Also there is an article that shows how token-ring switching stacks up against other alternatives.

Select NetRef, Buyer's Guide then LAN Switches.

http://www.nwfusion.com

And finally, if support in LAN switches is any indication of future trends, 100VG-AnyLAN may be doomed to extinction. Only three vendors indicate support for it, including Hewlett-Packard Co., which has single-handedly championed 100VG-AnyLAN technology for years. HP is now also adding support for 100Base-T in its switches. The others are Plaintree Systems, Inc. and Plexcom, Inc.

Switching technologies

Switch configurations aside, you will also find variability in what goes on inside them. While switches, generally speaking, perform much as multiport bridges, they have adopted a few subtle technology innovations.

A characteristic that bridges and their higher level brethren — routers — share is a variable delay imposed on packets passing through them. This is due to the inherent store-and-forward processing of bridges and routers, where whole packets are received, examined, processed and then queued for retransmission.

As it turns out, the majority of switches today employ the same store-and-forward technology. A few, though, employ a technique generically called cut-through switching, which offers a more-or-less constant transit delay.

Packets are forwarded in cut-through switching based on a very fast examination of just the first dozen or so bytes, enough to indicate the source and destination address and sometimes the protocol type. This makes it possible to start forwarding a packet even before its entire contents have been received.

This provides two benefits: a fairly constant delay, or latency, for all packets; and, in many cases, a generally higher through-

ADVANCESTACK SWITCHES

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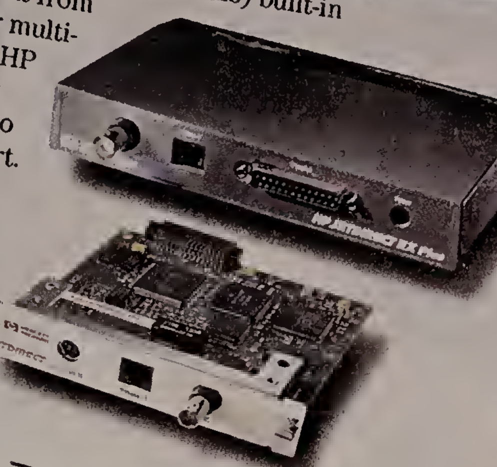

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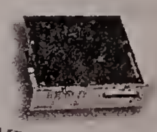

Router 210/SNMP. Connectivity to remote site and network management

Dial-A-LAN. Dial-in/Dial-out access for remote portables or PCs

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This probably won't send people scrambling for the record books. But it may well represent the biggest LAN product introduction ever.
And we've still got a ton of networking products in the pipeline. Which should leave no doubt about our commitment to networking.
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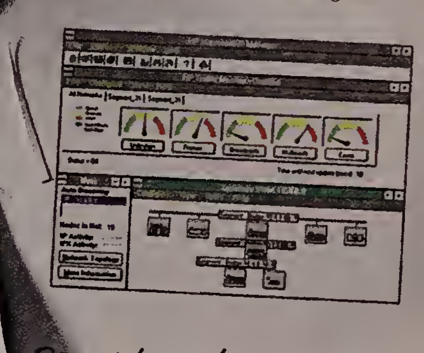

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AdvanceStack architecture, they're similar in form, factor, look, feel,
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These new 100VG-base
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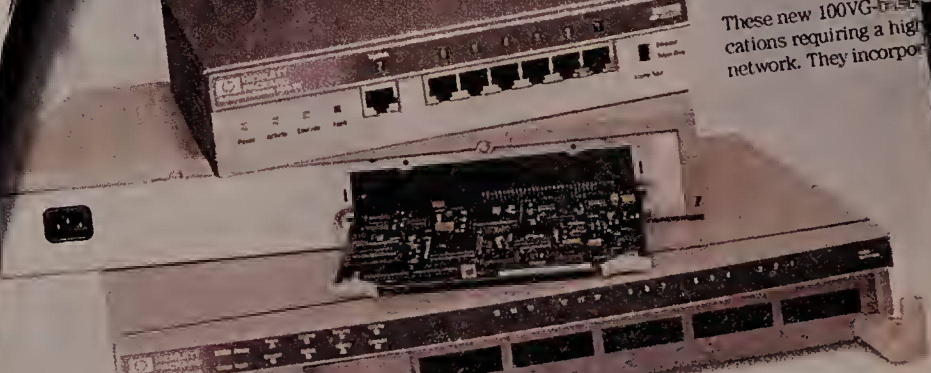

ADVANCESTACK 100VG HUBS

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HEWLETT® PACKARD

put than a comparably configured store-and-forward bridge or router. These benefits are assumed if everything else is equal, which it seldom is.

Unfortunately, cut-through switching can be used only between the same types of LANs. For mixed-LAN environments, virtually all switches will use store-and-forward technology because moving from one LAN type to another invariably requires some packet reformatting and speed transition.

Besides the fact that relatively few switches support it, another drawback to cut-through is that errored packets — packets with cyclic redundancy check errors — and too-short, or runt, packets can mistakenly be forwarded. These packets cannot be legitimately received by any node and just clutter up the network.

A few vendors, including Andrew Corp. and IBM, have adopted permutations of cut-through switching — termed modified or adaptive cut-through — so that more of the packet (typically up to 64 bytes) can be examined before it is forwarded. This avoids the forwarding of runt packets, but it doesn't necessarily prevent all bad packets from mistakenly being forwarded.

The runt packets that result from collisions on Ethernet are usually only 8- to 24-bytes long. Being programmed to view the first full 64 bytes of a packet, then, lets the switch spot and eliminate runts. But this won't ensure that the full packet doesn't have an error.

So, while cut-through and its permutations offer some advantages, not all users may be able to benefit from it or be willing to accept its limitations. The optimum case is where the switch supports some form of cut-through as well as store-and-forward switching, and lets you specify as part of the switch configuration which technique, or combination of techniques, to use.

You also have to consider a switch's throughput and latency. The Buyer's Guide chart gives you what vendors reported as their aggregate forwarding rate and latency for traffic consisting of fairly small, 64-byte packets.

A few words of caution against strictly interpreting this data. The throughput figures invariably represent best-case, optimum conditions, which, in some cases, may reflect unrealistic configurations.

You'll see nearly a dozen high-end switches listed in the chart as having forwarding rates in excess of a million packets per second. While such throughputs are achievable, these figures may be based on multiple, separate traffic streams passing between ports in such a way as to reflect a theoretical, laboratory throughput maximum.

Virtual LANs

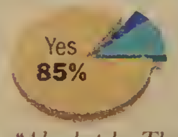
One of the most significant recent developments in the marketplace is virtual LANs, which enable a network administrator to set up connectivity groupings of specific nodes and users on a temporary or quasipermanent basis.

The Buyer's Guide chart shows three aspects of vendors' VLAN support: whether VLANs are set up via a graphical user interface (GUI); the number of nodes that can be aggregated into a VLAN; and the number of VLANs that can be concurrently set up and running on the switch.

Reader views on LAN switches

Based on 100 interviews

Are you happy enough with your LAN switch to buy another one?

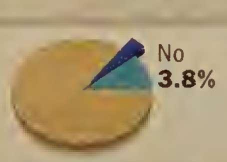


Based on responses from 53 experienced LAN switch users.

"We've had good performance, they are easily configured and they've done what was advertised."

"Absolutely. Their performance is more than we expected. There is a good price, and we're pleased with our network management."

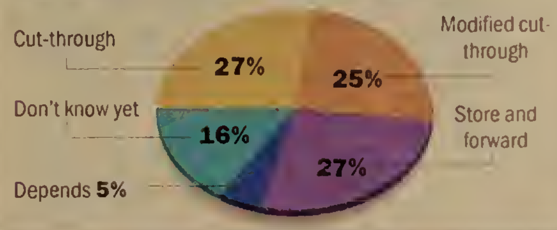
"They're helping us a lot. They increase throughput and make managing the LAN easier."



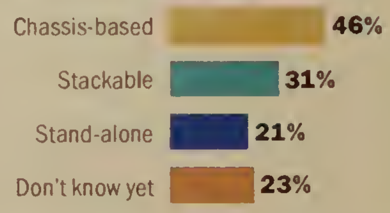
"We are dissatisfied with their RMON features."

"They lack features such as IP fragmentation."

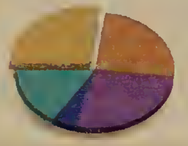
What method of LAN switching do you prefer?



What type of switch did/will you buy?



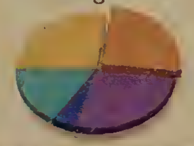
Cut-through **27%**



"It is more effective than store and forward because it only reads parts of packet headers. And from what I've read, modified cut-through is still too new."

"You buy switches for performance, and cut-through will give the best performance."

Modified cut-through **25%**



"It has the performance of cut-through without the overhead of store and forward."

"It's like adaptive switching, which offers you the best of the other two."

"I'm willing to trade off a slight decrease in the speed cut-through offers in order to prevent the passage of runt packets."

Store and forward **27%**

"It offers the opportunity to do things like filtering down the road."

"I have mixed feelings about each, but I lean to store and forward because it won't pass decrepit packets."

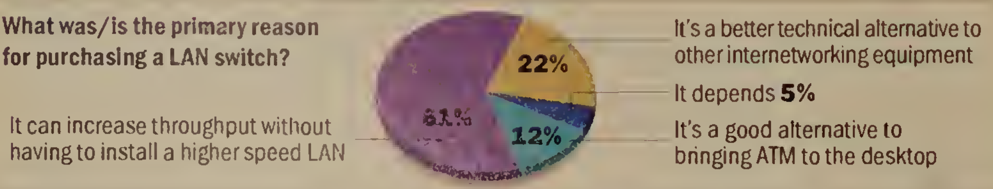
"It's beneficial when you have to switch between topologies such as going from Ethernet to FDDI."

It depends **5%**

"You'd use store and forward with heavily congested networks, and modified cut-through with lightly congested ones."

"The switch we have can do both cut-through and store and forward. It will use cut-through until it sees the threshold of errors go up, go to store and forward, and eventually return to cut-through."

What was/is the primary reason for purchasing a LAN switch?



Better technical alternative **22%**

"It's a quick and easy way to solve problems, and it's better than segmenting through routers."

"The rest are outdated."

Keep from moving to higher speed LAN **61%**

"You preserve your initial LAN investment but get increased throughput"

"I don't always think that faster is better. With a LAN switch, you can leverage your investment in existing hubs and adapters while still getting better performance and throughput."

Good alternative to bringing ATM to the desktop **12%**

"ATM is not proven yet, and I need to increase the speed of my network."

"I don't want to bring ATM to the desktop because I don't want to replace all of my network adapters."

The survey was conducted by Focus Data, an independent market research firm in Framingham, Mass., that gathers primary data concerning the enterprise network environments and needs of end users. To inquire about obtaining full survey results, send E-mail to mdabbon@focusdata.ultranet.com or call Mona Dabbon at (508) 626-2556.

NetworkWorld Short LIST

The Short List highlights products Network World *recommends you examine when shopping for a LAN switch. The vendors and products cited here are among the leading contenders for these particular environments: workgroup, workgroup to backbone, and backbone. Many other viable contenders in each environment may better suit your specific needs.*

Workgroup LAN switches

D-Link Systems, Inc.'s Workgroup Switch DES-608 deserves a look in the plain-vanilla, Ethernet-only switch category. Although it has a fixed configuration, the little eight-port unit carries a no-frills price of less than $200 per port.

If you have a mixed 10M/100M bit/sec Ethernet environment, look at **Bay Networks, Inc.**, most notably its **LattisSwitch,** which has selectable ports capable of operating at either speed plus virtual LAN support and plenty of horsepower. Also, check out **Cray Communications, Inc.'s ES-2410** and **ES-2420 Matchbox Switches** and **ES-1810** and **ES-1820 System Center Switches,** which are attractively priced, support VLANs and are configurable for a mix of switching technologies.

Token-ring-only shops should take a gander at **Andrew Corp.'s Switch-Lynx/TR.** The vendor knows how to get token ring to perform, and this high-power switch comes at a good price.

Workgroup-to-backbone LAN switches

Two vendors were tapped from among the dozens whose switches can get your Ethernet workgroups well connected with Asynchronous Transfer Mode or FDDI backbones. **Fore Systems, Inc.,** the undisputed ATM switch leader, offers the modular **ES-3810 Ethernet Workgroup Switch** that can pump data from as many as to 72 switched Ethernet segments over an ATM backbone. **UB Networks, Inc.'s GeoRim/E** deserves a long look if you want a lot of flexibility in configuring switched Ethernet ports, along with solid, optional FDDI or 100Base-T connectivity.

Backbone LAN switches

Three powerhouses were picked for this category. Give **Digital Equipment Corp.'s GIGAswitch/FDDI system** the once-over for its incredible but proven switched throughput in burgeoning FDDI backbones. Also check out **Cisco Systems, Inc.'s** series of **Catalyst** systems, which collectively address a broad range of configurations, throughputs and mixed LAN topologies. And don't forget **Xylan Corp.,** whose **OmniSwitch** products provide impressive, modular flexibility for almost any mix of LAN environments.

LAN switches

Company	Product	Type							LAN types						Ports in typical maximum configuration	Switch technology					Performance		Virtual LAN support			Special features	Price for typical maximum configuration, unless noted otherwise
		Stand-alone	Stackable (max. in stack)	Plug-in module	Chassis (no. of slots)	Fixed configuration	Fixed and one modular port	Fixed and modular ports	Ethernet	100BaseT	FDDI	Token ring	ATM	100VG-AnyLAN		Store-and-forward	Cut-through	Modified/adaptive cut-through	User-selectable	User-configurable filtering	Max. forwarding rate (packets/sec)	Latency (Microseconds for 64-byte packet)	Set-up via GUI	Max. stations/nodes per VLAN channel	Max. no. of concurrent VLANs per switch		
Accton Technology Corp. (408) 452-8900	SwitchHub-8s EH-2002	✓				✓			✓						8 Ethernet		✓				14K	15				Half and full-duplex ports can operate concurrently	$1,695
	SwitchHub-8se EH-2005-TX	✓				✓			✓	✓					6 Ethernet and 2 100BaseT		✓				144K	60				Real-time statistics on front-panel display	$2,599
Agile Networks, Inc. (508) 263-3600	ATMizer 121 Ethernet Switch	✓					✓		✓				✓		12 Ethernet and 1 or 2 155M bit/sec ATM	✓					90K	50-100		8,192	256	Automated set-up of VLANs	$24,500
Alcatel Data Networks (703) 689-7400	1100 LSS Series	✓			5, 9				✓	✓	✓	✓	✓		Configuration options vary widely	✓					700K	35-50	✓	No limit	32	Partial RMON support; IP and IPX routing; redundancy options	$7,450 for 12 Ethernet ports Chassis: $9,095
Allied Telesyn International Corp. (206) 487-8880	AT-4016 TurboStack Series	✓					✓		✓				✓		16 Ethernet and 1 155M bit/sec ATM	✓		✓	✓		50K	42		2,048	64	Management software runs on most leading SNMP managers	$12,320
	AT-TS9xTR Series	✓		✓			✓		✓	✓			✓		8 Ethernet and 2 100BaseT or 1 155M bit/sec ATM	✓		✓	✓		40K	42		2,048	64	Up to 7 units can be interconnected in a multislot chassis	$6,995-$10,000
Andrew Corp. (310) 784-8000	**SwitchLynx/TR**	✓						✓				✓	✓		**12 token ring or 8 token ring and 2 155M bit/sec ATM**	✓	✓	✓	✓	✓	**296K**	**37**	✓	**NS**	**NS**	**Full-duplex token-ring support**	**$7,790 for 12 token-ring ports**
Asante Technologies, Inc. (408) 435-8401	Asante 5216 Switch	✓				✓			✓	✓					16 Ethernet and 2 100BaseT	✓		✓		✓	536K	70-80	✓	64	32	Full RMON support	$5,595
	Asante 5216xp Switch	✓						✓	✓	✓	✓				16 Ethernet and 1 or 2 FDDI or 100BaseT	✓		✓		✓	536K	70-80	✓	64	32	Full RMON support	$6,995+
Ascom Timeplex, Inc. (201) 391-1111	Synchrony ST-1000				15				✓		✓	✓	✓		60 Ethernet	✓					360K	50+		64	8	Optional multiprotocol routing software; WAN access and switching	$120,000 Chassis: $6,500
Bay Networks, Inc. (800) 776-6895	**LattisSwitch**	✓				✓			✓	✓					**16 10/100BaseT and 2 100BaseT**	✓					**2.9M**	**6**	✓	**1,024**	**32**	**Management software offered for most leading SNMP platforms**	**$16,495-$17,995**
	BayStack Ethernet Workgroup Switch	✓					✓		✓	✓					6 Ethernet and 1 100BaseT	✓				✓	14K	NS				Management software offered for most leading SNMP platforms	$4,490-$4,790
	EtherCell	✓				✓			✓				✓		8 or 12 Ethernet and 1 155M bit/sec ATM	✓					75K	86	✓	1,024	13	Management software for SunNet Manager	$9,995-$14,995
	28200 Modular Ethernet Switch				✓				✓	✓	✓				32 Ethernet	✓					NS	80	✓	64	32	Optional integrated RMON; redundant link capability	$12,975 Chassis: $2,995
	System 5000 Switching Module			✓				✓	✓	✓	✓				16 Ethernet and 10 100BaseT	✓					NS	50	✓	8,000	64	Redundant link and other redundancy capabilities	$24,400
	Centillion 100				6				✓	✓		✓	✓		88 Ethernet or 24 token ring or 24 155M bit/sec ATM	✓		✓	✓	✓	1M	87-124	✓	No limit	32	Integral RMON support	$40,520-$57,970 Chassis: $10,040
Cabletron Systems, Inc. (603) 332-9400	FN100 FastNetwork Switch	✓				✓			✓	✓					8 or 16 10/100BaseT or 100BaseT	✓					1.2M	15		NS	100	VLAN consists of port-based broadcast control	$16,800-$31,135
	FN10 FastNetwork Switch	✓				✓			✓	✓					12 or 24 Ethernet and 1 100BaseT	✓				✓	240K	15		NS	100	VLAN consists of port-based broadcast control	$8,660 for 12 Ethernet ports
	3C05 ATX LAN Switch				5				✓	✓	✓	✓			40 Ethernet or 20 100BaseT or 20 token ring or 5 FDDI	✓				✓	NS	20		255	150	Multiprotocol routing	$46,255-$64,255 Chassis: $19,280
	7C04 Workgroup SmartSwitch				✓				✓	✓	✓		✓		48 Ethernet, 30 100-BaseT or 6 FDDI or 6 155M bit/sec ATM	✓				✓	750K	20	✓	8,192	1,024	Embedded routing software; partial RMON support	$43,670-$78,235 Chassis: $18,880
	8H02-16 10/100 Workgroup SmartSwitch	✓						✓	✓	✓					14 Ethernet	✓				✓	250K	20	✓	8,192	1,024	Embedded routing software; optional 1 full-duplex 100BaseT port	$7,995
	MMAC-Plus SmartSwitch System				14				✓	✓	✓		✓		336 Ethernet or 168 100BaseT or 28 FDDI	✓				✓	750K	20	✓	8,192	1024	Embedded routing software; partial RMON	$250,000-$556,000 Chassis: $17,519
Cisco Systems, Inc. (800) 553-6387	**Catalyst 3000 and Matrix System**		**8**					✓	✓	✓			✓		**16 Ethernet and 4 100BaseT or 2 155M bit/sec ATM**	✓	✓		✓	✓	**714K**	**40-64**	✓	**NS**	**NS**	**Up to 192 Ethernet ports in fully expanded stackable configuration**	**$4,795**
	Catalyst 5000				**5**			✓	✓	✓					**192 Ethernet and 2 100BaseT**	✓				✓	**1.2M**	**10+**	✓	**No limit**	**1000**	**All Ethernet, 100BaseT and ATM interfaces can be full-duplex**	**$31,175**
	Catalyst 1700 and 2100	✓				✓			✓	✓					**25 Ethernet and 2 100BaseT**	✓	✓	✓	✓	✓	**450K**	**31-70**	✓	**(1)**	**4**	**Shared memory architecture**	**$4,495-$4,995**
	Catalyst 2800	✓						✓	✓	✓	✓				**25 Ethernet and 16 100BaseT**	✓	✓	✓	✓	✓	**450K**	**31-70**	✓	**(1)**	**4**	**100BaseT and FDDI modular media options**	**$11,767**
CNet Technology, Inc. (408) 954-8000	CNSH-40 and 80	✓				✓			✓						4 or 8 Ethernet		✓	✓			NS	NS				Some Ethernet ports can operate in full-duplex	$1,798 for 8 Ethernet ports
	CNSH-1080i	✓				✓			✓	✓					6 Ethernet and 2 100BaseT		✓	✓			NS	NS				Some Ethernet ports can operate in full-duplex	$2,888
	CNSH-600i	✓				✓			✓	✓					6 10/100BaseT		✓				NS	NS				Ports can operate in full-duplex	$3,888
Compaq Computer Corp. (800) 345-1518	Netelligent 5000 10/100 Switch							✓	✓	✓	✓				12 Ethernet and 1 100BaseT	✓					89K	NS		(2)	16	Limited VLAN support; user can configure groupings of ports only	$6,534
	Netelligent 5506 100Base-T Switch	✓				✓			✓	✓					6 100BaseT	✓					892K	12				Ports can operate in full-duplex	$5,567
Cray Communications, Inc. (301) 317-7710	**ES-2410 and ES-2420 MatchBox Switches**	✓						✓	✓	✓					**36 Ethernet and 1 100BaseT**	✓	✓	✓	✓	✓	**600K**	**25-60**	✓	**8,000**	**10**	**High-end model includes full RMON support on all ports**	**$5,495-$9,395**

Product names highlighted in color were selected for the Short List.

Chart compiled by Mier Communications, Inc.

Footnotes:

(1) Up to 27 ports.

(2) Per port basis.

(3) Per module.

NS = Not specified

LAN switches

Company	Product	Type							LAN types						Ports in typical maximum configuration	Switch technology					Performance		Virtual LAN support			Special features	Price for typical maximum configuration, unless noted otherwise
		Stand-alone	Stackable (max. in stack)	Plug-in module	Chassis (no. of slots)	Fixed configuration	Fixed and one modular port	Fixed and modular ports	Ethernet	100BaseT	FDDI	Token ring	ATM	100VG-AnyLAN		Store-and-forward	Cut-through	Modified/adaptive cut-through	User-selectable	User-configurable filtering	Max. forwarding rate (packets/sec)	Latency (Microseconds for 64-byte packet)	Set-up via GUI	Max. stations/nodes per VLAN channel	Max. no. of concurrent VLANs per switch		
Cray Communications, Inc. (301) 317-7710	**ES-1810 and ES-1820 System Center Switches**			✓				✓	✓	✓					**36 Ethernet and 1 100BaseT**	✓	✓	✓	✓	✓	**600K**	**25-60**	✓	**8,000**	**10**	**High-end model includes full RMON support on all ports**	**$5,995-$9,995**
CrossComm Corp. (508) 481-4060	CrossSwitch	✓		✓				✓	✓	✓					30 Ethernet and 2 100BaseT	✓				✓	476K	10-71	✓	NS	16	Full integrated RMON; redundancy options	$3,495+
	RiserSwitch 100	✓						✓	✓	✓					14 Ethernet and 8 100BaseT	✓				✓	952K	61-71	✓	NS	32	Optional full-duplex 100BaseT ports	$11,995+
	ATM Edge Switch	✓		✓				✓	✓	✓			✓		22 Ethernet and 2 100BaseT and 1 155M bit/sec ATM	✓				✓	476K	61-71	✓	NS	32	Standalone or plug-in module in vendor's 1, 2 or 8-slot chassis	$24,490
D-Link Systems, Inc. (714) 455-1688	ProFAST Switch DES-2205	✓				✓			✓	✓					4 Ethernet and 1 100BaseT	✓				✓	27K	120-175	✓	NS	5		$1,795
	ProFAST Switch DES-2208	✓						✓	✓	✓					6 Ethernet and 2 100BaseT	✓	✓		✓	✓	507K	40-64					$2,890
	Workgroup Switch DES-608	✓				✓			✓						**8 Ethernet**	✓	✓		✓	✓	**156K**	**40-64**					**$1,590**
Decision Data, Division of IIS, Inc. (215) 957-9500	NetWiz TurboSwitch 2000				6, 20				✓	✓	✓	✓			120 Ethernet or 120 token ring	✓	✓		✓	✓	1M	10	✓	64,000	256	No switching between Ethernet and token ring; FDDI access is via an external device	$71,840 for 120 Ethemet ports
Develcon Electronics, Ltd. (800) 667-9333	Orbitor 7508S	✓				✓			✓						8 Ethemet	✓				✓	60K	35-49		(2)	4	Limited VLAN support; user can assign ports to bridge groups	$1,599
	Orbitor 7516 Series	✓					✓		✓	✓					16 Ethernet and 1 100BaseT	✓				✓	193K	35-49					$3,995-$4,495
Digi International, Inc. (612) 912-3444	RightSwitch SE			✓		✓			✓						4 or 6 Ethernet	✓				✓	45 K	70				Switch is a PCI or EISA card that plugs into PC	$1,695- $2,595
Digital Equipment Corp. (800) 457-8211	DECswitch 900EE	✓		✓		✓			✓						6 Ethernet	✓				✓	63K	35-40				Optional IP-only or multiprotocol routing	$5,995-$8,995
	DECswitch 900EF and 900FO, and PE switch 900TX	✓		✓		✓			✓		✓				6 Ethemet and 1 FDDI	✓				✓	63K	35-40	✓	8,000	6	Up to 250 VLANs supported across switches via FDDI	$4,095-$8,995
	DECswitch 400				5, 9				✓				✓		64 Ethernet	✓				✓	100K	75	✓	No limit	32	VLAN supported for port, bridge and router levels	$58,816 Chassis: $10,045
	GIGAswitch/FDDI system				**11**						✓		✓		**32 FDDI and 2 155M bit/sec ATM**	✓	✓		✓	✓	**6.2M**	**15**	✓	**(2)**	**34**	**ATM interfaces are switchable T3 or OC-3; redundancy options**	**$208,800 Chassis: $21,000**
	DECswitch 900ET	✓		✓		✓			✓			✓			1 Ethernet and 2 token ring	✓				✓	11K	NS				Optional IP-only and multiprotocol routing	$4,995
Fibronics International, Inc. (508) 671-9440	GigaFrame Switch XM53x switching cards			✓				✓	✓	✓	✓				20 Ethernet	✓	✓				160K	NS				Management software offered for most leading manager platforms	$7,495-$14,490
	GigaFrame Ethernet Switching Cards XM516 and XM517			✓				✓	✓						14 Ethemet	✓	✓				100K	57				Management software offered for most leading manager platforms	$8,260+
	Workstation/Server Switch FX8616 and FX8618	✓						✓	✓	✓	✓				16 Ethernet and 1 FDDI and/or 100BaseT	✓					160K	NS				Management software offered for most leading manager platforms	$8,950+
Fore Systems, Inc. (888) 404-0444	**ES-3810 Ethernet Workgroup Switch**	✓						✓	✓	✓			✓		**72 Ethernet and 1 155M bit/sec ATM**	✓					**720K**	**10-55**	✓	**No limit**	**16**	**Full integrated RMON; per-port statistics**	**$17,480**
	PowerHub 4000 and 4100	✓				✓			✓	✓	✓				4 Ethernet and 4 100BaseT and 1 FDDI	✓				✓	130K	100	✓	8,192	256	Integral multiprotocol routing	$14,950
	PowerHub 6000				✓				✓	✓	✓		✓		60 Ethernet	✓				✓	130K	100	✓	8,192	256	Integral multiprotocol routing	$34,650 Chassis: $10,200
	PowerHub 7000				5, 10				✓	✓	✓		✓		216 Ethernet	✓				✓	140K	100	✓	8,192	256	Integral multiprotocol routing	$90,950 Chassis: $22,400
Garrett Communications, Inc. (510) 438-9071	Magnum 5000 Switching Hub	✓				✓			✓						8 Ethernet	✓				✓	60K	97					$1,995
Hewlett-Packard Co. (800) 533-1333	AdvanceStack 10/100 LAN Switch-16	✓						✓	✓	✓				✓	16 Ethernet and 4 100VG-AnyLAN or 2 100BaseT	✓	✓	✓	✓	✓	NS	40-80				Optional multiprotocol routing software	$16,300
	AdvanceStack Switch 2000				6				✓					✓	24 Ethernet and 12 100VG-AnyLAN	✓				✓	1M	61	✓	10,000	8	Network-layer protocol filtering; FDDI support planned for 10/96	$12,600-$36,000 Chassis: $1,999
	AdvanceStack Switch 200	✓				✓			✓					✓	16 Ethemet and 2 100VG-AnyLAN	✓				✓	NS	23					$3,400
IBM (800) 426-2255	8271 Nways Ethernet LAN Switches	✓					✓	✓	✓	✓					12 or 24 Ethernet	✓	✓	✓	✓	✓	89K	23-42	✓	(2)	8	Full-duplex operation on Ethernet ports; FDDI and ATM modules planned	$5,000 for 12 Ethernet ports
	8272 Nways Token Ring LAN Switches	✓					✓	✓	✓			✓			12 or 24 token ring	✓	✓	✓	✓	✓	149K	55	✓	(2)	8	Optional bridge connects token ring to Ethernet	$13,195 for 24 token ring ports
Intel Corp. (800) 538-3373	Express Switching Hub	✓						✓		✓					7 100BaseT	✓				✓	NS	5		(2)	128		$7,385
Intellicom, Inc. (818) 407-3900	OfficeStak				12				✓	✓					36 Ethernet	✓				✓	50K	20				Integral RMON; integral IP and IPX routing	$31,000 Chassis: $3,395
LanOptics, Inc. (214) 738-6900	T-SwitchPro	✓	5			✓						✓			8 token ring per unit	✓	✓		✓	✓	500K	30-50	✓	(2)	8	Management software runs on most leading manager platforms	$12,000
Lantronix (714) 453-3990	LSW8	✓						✓	✓	✓					6 Ethernet and 2 100BaseT	✓				✓	NS	60					$3,990-$6,580
Madge Networks, Inc. (800) 876-2343	Collage Workgroup Switch Family		12					✓	✓				✓		12 Ethernet and 2 155M bit/sec ATM	✓					275K	40				12 base ports can be Ethernet or 25M bit/sec ATM, or a mix	$9,785

LAN switches

Company	Product	Type							LAN types						Ports in typical maximum configuration	Switch technology					Performance		Virtual LAN support			Special features	Price for typical maximum configuration, unless noted otherwise
		Stand-alone	Stackable (max. in stack)	Plug-in module	Chassis (no. of slots)	Fixed configuration	Fixed and one modular port	Fixed and modular ports	Ethernet	100BaseT	FDDI	Token ring	ATM	100VG-AnyLAN		Store-and-forward	Cut-through	Modified/adaptive cut-through	User-selectable	User-configurable filtering	Max. forwarding rate (packets/sec)	Latency (Microseconds for 64-byte packet)	Set-up via GUI	Max. stations/nodes per VLAN channel	Max. no. of concurrent VLANs per switch		
Madge Networks, Inc. (800) 876-2343	Smart Ringswitch				✓						✓	✓	✓		12 token ring	✓	✓		✓	✓	300K	40	✓	(2)	16	Supports full-duplex operation; full integrated RMON	$12,950
Microdyne Corp. (703) 329-3700	Eagle Switch 4x4 and 4+100	✓				✓			✓	✓					4 Ethernet and 1 or 4 100BaseT	✓					180K	NS					$2,295-$2,995
NBase Switch Communications (818) 773-0900	MegaSwitch NH2007 and NH2012	✓						✓	✓	✓					12 10/100BaseT or 7 100BaseT	✓				✓	10M	4	✓	NS	64	Full-duplex operation; partial RMON	$11,940 for 12 10/100BaseT ports
Network Peripherals, Inc. (408) 321-7300	NuSwitch FE-Series 100/100 Segment Switching Hubs	✓				✓				✓					2 or 12 100BaseT	✓				✓	NS	NS	✓	No limit	16	Special switch-to-switch link supports redundancy and load balancing	$8,995 for 12 100BaseT ports
	NuSwitch FE-Series 10/100 Segment Switching Hubs	✓				✓			✓	✓					5, 6 or 10 Ethernet and 1 or 2 100BaseT	✓				✓	NS	4	✓	No limit	16	Special switch-to-switch link supports redundancy and load balancing	$3,995 for 10 Ethernet and 2 100BaseT ports
	NuSwitch FE-Series 10/100 Multi-Server Swtiching Hubs	✓				✓			✓	✓					6 or 12 Ethernet and 5 100BaseT	✓				✓	149K	6-71	✓	No limit	16		$5,995 for 12 Ethernet and 5 100BaseT ports
	NuSwitch FE-Series 10/100 Desktop Switching Hubs	✓				✓			✓	✓					24 Ethernet and 2 100BaseT	✓				✓	NS	4	✓	No limit	16	Full-duplex operation on 100BaseT ports	$2,995
	NuSwitch FD-Series 10/100 Segment Switching Hubs	✓					✓		✓		✓				12 Ethernet and 1-6 FDDI (all 1 FDDI segment)	✓				✓	157K	6 -71	✓	No limit	16	Integrated FDDI concentrator	$8,495 for 12 Ethernet and 2 FDDI ports
Network Systems Corp. (612) 424-4888	ELS 5000 and 9000				5, 9				✓		✓	✓	✓		32 or 64 Ethernet	✓				✓	400K	30-75	✓	NS	64	VLANs can operate across multiple LAN types and network levels	$28,050 for 32 Ethernet ports Chassis: $8,250
Newbridge Networks, Inc. (800) 368-4843	VIVID Yellow Ridge Ethernet Switch	✓				✓			✓				✓		12 Ethernet and 1 155M bit/sec ATM	✓				✓	174K	30-32	✓	8,000	NS	Also supports forwarding based on network-layer protocols	$10,395
Olicom USA, Inc. (800) 265-4266	CrossFire Token Ring Switch	✓					✓					✓			12 token ring	✓	✓		✓		NS	56-60		(2)	8	Menu-based VLAN set-up; 155M bit/sec ATM planned	$7,392
OST, Inc. (703) 817-0400	Xcellys LAN/ ATM Switch Family	✓			4, 16				✓	✓					96 Ethernet or 10/100BaseT	✓				✓	90K (3)	47-87	✓	16,384	64	Redundancy options; VLAN filtering based on IP and IPX address	$61,985 for 96 Ethernet ports Chassis: $4,495
Performance Technology, Inc. (716) 256-0200	Nebula 2000 Protocol Switch	✓				✓			✓						8 Ethernet	✓				✓	15K	NS	✓	4,096	8	2 ports can operate in full-duplex; optional multiprotocol routing	$3,995
Plaintree Systems, Inc. (617) 290-5800	WaveSwitch 4800				8					✓	✓		✓	✓	64 100BaseT or 100VG-AnyLAN	✓		✓		✓	1.2M	6	✓	No limit	32	Multilayer, multilevel VLANs; full RMON	$46,000 for 100BaseT ports Chassis: $29,995
	WaveSwitch 100-16	✓						✓	✓	✓	✓			✓	16 Ethernet and 10 100VG-AnyLAN	✓					150K	7-72					$7,690
	WaveSwitch 4+1 and 4+4	✓				✓			✓	✓					4 Ethernet and 4 100BaseT	✓					210K	72					$1,995
	WaveSwitch 1018 and 1216	✓				✓		✓	✓	✓	✓		✓	✓	16 Ethernet and 16 100BaseT	✓		✓	✓	✓	536K	6-64	✓	No limit	32	Multilayer, multilevel VLANs; full RMON	$9,985
Plexcom, Inc. (800) 753-9526	PlexSwitch 5016 and 5012FL	✓						✓	✓	✓	✓			✓	12 Ethernet and 14 additional ports	✓				✓	195K	60					$4,895 for 12 Ethernet ports
	PlexSwitch 5106	✓					✓		✓						6 Ethernet	✓				✓	NS	60					$2,495
Proteon, Inc. (508) 898-2800	CSX 900 Series Ethernet Switching Routers	✓				✓			✓	✓					24 Ethernet and 2 100BaseT	✓					387K	12				One model includes 2 WAN ports (up to 2M bit/sec) for remote connectivity	$2,575
	CSX 901T Token Ring Switch	✓					✓					✓			12 token ring	✓	✓	✓	✓	✓	133K	36-146		No limit	16	Switch automatically reconfigures itself depending on errors	$6,900
Retix (310) 828-3400	SwitchStak 5000 Stackable Ethernet Switch		8					✓	✓	✓					128 Ethernet in full stack	✓				✓	120K (3)	64				Stackable configuration supports a dual redundant ring	$52,760
Standard Microsystems Corp. (516) 435-6000	EZ Switch	✓				✓			✓						6 Ethernet		✓				15K	20				Full-duplex operation, configurable on a per-port basis	$1,199
SysKonnect, Inc. (800) 752-3334	SnapSwitch 6020	✓					✓		✓	✓	✓				16 Ethernet and 1 100BaseT or FDDI	✓				✓	200K	41-49					$3,495 for 16 Ethernet ports
3Com Corp. (800) 638-3266	SuperStack LinkSwitch 2200	✓				✓			✓		✓				16 Ethernet and 1 FDDI	✓				✓	193K	25-30		8,192	32	Multilevel VLANs; redundancy options	$7,995
	LinkSwitch 1000	✓						✓	✓	✓					12 or 24 Ethernet and 1 100BaseT	✓	✓	✓	✓		NS	8-40	✓	No limit	16	Multiple units can share same power supply; integral partial RMON	$3,975 for 12 Ethernet and 1 100BaseT ports
	LinkSwitch 2700	✓				✓			✓				✓		12 Ethernet and 1 155M bit/sec ATM	✓					NS	NS	✓	NS	NS		$8,400
	LinkSwitch 3000 and 3000TP	✓						✓	✓	✓					6-8 100BaseT	✓					NS	8	✓	No limit	16	Various models support mixed fiber and copper configurations	$7,995 for 8 100BaseT ports
	LANplex 2500	✓							✓	✓	✓				16 Ethernet and 2 100BaseT	✓				✓	565K	20-30	✓	NS	NS	Multilevel, multilayer VLANs; integral multiprotocol routing	$15,685
	LANplex 6000				4, 12				✓	✓	✓				176 Ethernet	✓		✓		✓	1.6M	10-25	✓	8,192	32	Multiprotocol routing; partial RMON	$172,900 Chassis: $13,300
UB Networks, Inc. (800) 777-4526	GeoRim/T	✓					✓				✓	✓			12 token ring	✓	✓	✓	✓	✓	22K	55		(2)	8	High-speed link for connecting multiple switches	$5,600

Product names highlighted in color were selected for the Short List.

Chart compiled by Mier Communications, Inc.

Footnotes:

(1) Up to 27 ports.

(2) Per port basis.

(3) Per module.

NS = Not specified

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LAN switches

Company	Product	Type: Stand-alone	Type: Stackable (max. in stack)	Type: Plug-in module	Type: Chassis (no. of slots)	Type: Fixed configuration	Type: Fixed and one modular port	Type: Fixed and modular ports	LAN types: Ethernet	LAN types: 100BaseT	LAN types: FDDI	LAN types: Token ring	LAN types: ATM	LAN types: 100VG-AnyLAN	Ports in typical maximum configuration	Switch technology: Store-and-forward	Switch technology: Cut-through	Switch technology: Modified/adaptive cut-through	Switch technology: User-selectable	Switch technology: User-configurable filtering	Performance: Max. forwarding rate (packets/sec)	Performance: Latency (Microseconds for 64-byte packet)	Virtual LAN support: Set-up via GUI	Virtual LAN support: Max. stations/nodes per VLAN channel	Virtual LAN support: Max. no. of concurrent VLANs per switch	Special features	Price for typical maximum configuration, unless noted otherwise
UB Networks, Inc. (800) 777-4526	GeoRim/E	✓							✓	✓	✓				12 Ethernet	✓				✓	90K	45-80	✓	(2)	32	Optional IP routing software	$5,995
	GeoRim/Edt	✓				✓			✓	✓					16 Ethernet and 1 100BaseT	✓				✓	193K	45-80	✓	(2)	32		$4,195
	Ethernet Center Switch			✓					✓						12 Ethernet	✓					120K	60-70	✓	No limit	65K	Full redundancy on all ports; connects through system bus to FDDI, ATM and/or token ring	$11,995
	DragonSwitch ASM9100 and ASM9108			✓		✓			✓						16 Ethernet	✓					120K	60-70	✓	No limit	65K	Connects through system bus to FDDI, ATM and/or token ring	$13,200
U.S. Robotics, Inc. (847) 982-5010	TotalSwitch LAN Switching Hub				✓				✓	✓					24 Ethernet and 2 100BaseT	✓				✓	595K	100	✓	32 (2)	64		$6,280
Whitetree, Inc. (415) 855-0855	WS3000 Workgroup Switch		12					✓	✓				✓		12 Ethernet and 1 155M bit/sec ATM	✓					179K	10-91	✓	200	8	Ethernet ports alternately support 25M bit/sec ATM	$9,190
Whittaker/Xyplex (508) 952-4700	Network 9000 Hub with 600 Series Switch Cards				7				✓	✓					140 Ethernet or 14 100BaseT	✓				✓	NS	28-40		NS	32	Optional routing software	$72,000 for 140 Ethernet ports Chassis: $3,140
	Desktop Ethernet Switch 1700L	✓					✓		✓	✓					32 Ethernet or 30 Ethernet and 2 100BaseT	✓	✓	✓	✓	✓	550K	49-70	✓	32 (2)	1	Partial RMON that provides statistics on per-port basis	$9,450 for 30 Ethemet and 2 100BaseT ports
	708 Ethernet Switch Module			✓		✓			✓						8 Ethernet	✓					45K	180	✓	NS	9		$7,200
Xedia Corp. (508) 658-7200	MADswitch 10 and Switch 10	✓				✓			✓						6 Ethernet	✓				✓	45K	80-120		2,048	3		$2,395
	MADswitch 10/100 and Switch 10/100 Series	✓				✓			✓	✓					6 Ethernet and 1 100BaseT	✓				✓	89K	80-120		2,048	3		$3,495+
XLNT Designs, Inc. (619) 487-9320	QuikEther-8 and QuikEther-16		5			✓			✓						8 or 16 Ethemet per unit	✓		✓	✓	✓	119K-238K	70-100	✓	No limit	8 per stack	Stack is managed as a single switch	$3,500 for 8 Ethernet ports
	QuikFDDI+ and QuikFDDI+4		5			✓			✓		✓				8 Ethernet and 1 FDDI	✓		✓	✓	✓	219K	70-100	✓	No limit	8	Stack is managed as a single switch	$9,999
	QuikEther100		5			✓			✓	✓					8 Ethernet and 2 100BaseT	✓		✓	✓	✓	298K	70-100	✓	No limit	8	Can be mixed in a 5-high stack with any of the vendor's switch units	$5,600
Xylan Corp. (818) 880-3500	**OmniSwitch 5 and OmniSwitch 9**				**5, 9**				✓	✓	✓	✓	✓		**96 Ethernet or mix of any supported LAN**	✓					**700K**	**35-50**	✓	**No limit**	**32**	**Integral IP and IPX routing; partial RMON**	**Chassis: $9,095 for 5 slots**
	PizzaSwitch	✓						✓	✓	✓	✓		✓		12 Ethernet and 2 to 8 high-speed uplinks	✓					NS	35-50	✓	No limit	32	Integral IP and IPX routing; partial RMON	$7,450 for 12 Ethemet ports

Product names highlighted in color were selected for the Short List.

Chart compiled by Mier Communications, Inc.

Footnotes:
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(2) Per port basis.
(3) Per module.
NS = Not specified

The availability of a GUI for VLAN set- p is a positive indication that VLAN oper- tion is an integral part of the switch's lesign instead of a contrived feature hat's been bolted on after the fact.

We asked vendors if they viewed VLANs s a way to improve performance and andwidth utilization between users in a LAN group, or as a security enhance- ent that limits connectivity and VLAN ccess to designated members of a group.

Overwhelmingly, vendors that support LANs viewed the capability as a security- nhancement. In many cases, they said LANs do very little, if anything, to nprove bandwidth utilization or roughput — either between the mem- ers of the VLAN or on a switchwide basis.

If VLAN support is a key reason for onsidering LAN switches, be sure to uery vendors about the nature and oper- tion of their VLAN offerings. Be aware, or example, that VLANs can address con- ectivity groupings at several levels.

Some vendors' VLANs are limited to ort groupings. This means you can ssign specific ports to a VLAN. However, his doesn't necessarily constrain specific sers to the same VLAN; all traffic arriving n any of those ports is passed to all other ports in the same grouping. This is a fairly rudimentary form of a VLAN because you can't further tailor the grouping to include or exclude specific users.

Vendors with such VLAN support include Compaq Computer Corp., Develcon, Inc., Digital, IBM, LanOptics, Inc., Madge, Olicom USA, Inc., UB Networks and Whittaker/Xyplex.

Bridge-based VLANs, or virtual bridged LANs, is the next higher layer of operation. With a bridged VLAN, you can specify and constrain the virtual network grouping to specific node addresses and, in most cases, specific multicast address sequences, and limit the propagation of broadcast messages. Most vendors with a VLAN capability support this form of it.

Some switch vendors also let you define VLANs based on some network layer information, such as a separate VLAN for all nodes using Novell, Inc.'s IPX protocol. Vendors that have multilayer, multilevel VLANs are identified in the Buyer's Guide chart in the column labeled "Special features" and include Network Systems Corp., Plaintree Systems and 3Com Corp.

The optimal VLAN environment is where a switch supports all these levels of operation, selectable by the user and configurable via a GUI.

Switching by any other name . . .

A final note on product selection pertains to the pros and cons of switching itself. Since switching between different LAN types involves a store-and-forward operation, latency will usually vary.

The result is a topology that, for the most part, is indistinguishable from bridged networks. In this case, switches may from time to time become congested. When they do, their buffers and queues overflow, and packets are dropped.

Switching should be distinguished from repeater-based hubs, which simply retransmit data received on one port to all other ports. Except for pure cut-through switching between segments of the same LAN type, switching in most environments is bridging.

Indeed, some vendors of traditional high-end bridge/routers, including Network Systems and Ascom Timeplex, Inc., have entered the switching arena with systems that are essentially still high-end bridge/routers.

Does this technically disqualify them from consideration as a LAN switch? Not at all.

That's because bridges and bridge/routers perform much the same job that switches do, especially in a mixed-LAN environment. And there are few cases where a store-and-forward switch will outperform a bridge or bridge/router given a comparable configuration and price.

If you expect switching to deliver considerably higher forwarding rates than existing bridging or bridge/router technologies, you will often be disappointed.

If you're looking for switching to deliver lower and consistent latency compared to bridges and bridge/routers, you may realize that only in a limited set of environments — those where some version of cut-through switching can be applied.

Mier is president of Mier Communications, Inc., a Princeton Junction, N.J.-based network consultancy, product test center and technical publisher. He can be reached at (609) 275-7311 or at ed@mier.com. Mier's upcoming special report, "The Switch Book," will provide detailed product comparisons and guidance on selecting and deploying LAN switching.

Management go-round

Roundtable participants point to problems managing distributed systems and applications but also see the way to salvation.

By Paul Desmond

As manager of domestic network architecture and design at United Parcel Service of America, Inc. (UPS), Philip Freyer has to help keep a 1,400-site net running smoothly. The problem is he has only limited management tools.

"I liken the search for network management to the Arthurian quest for the Holy Grail," Freyer said. "You search for it and search for it, but I don't think you find it."

To aid the quest, a group of vendors and users recently participated in a discussion on applications and systems management in Las Vegas, billed as the McConnell Consulting/*Network World* Managing Enterprise Networks roundtable.

One thing was clear from the discussion: The advent of distributed computing, and particularly Web technology, is raising some sticky management problems. "Distributed networks breed distributed problems," as Freyer put it.

Users and vendors alike acknowledge there is often a disconnect between what management products are able to detect and what is actually occurring. Users bemoan the lack of integrated tool sets capable of correlating network-related alerts with system- and application-related problems.

Ideas for solving net management problems are plentiful, though solutions aren't necessarily imminent. Tops on the list is the need for standards that make it possible to enhance applications so they can communicate management information. Another idea is to come up with a set of procedures that make it easier for console operators to deal with common problems in a fashion consistent with overall business objectives.

NetworkWorld Fusion

The roundtable continues. . .

We couldn't invite all our readers to this roundtable in person, but we can invite you to continue the discussion on Network World Fusion. We've lined up some roundtable participants to answer your application and systems management questions online all this week. And we'll keep the discussion going after that as long as there's interest, so go ahead and take advantage of this opportunity to quiz the experts.

Select Forum, then Managing Enterprise Networks Roundtable.

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The problem

The two user representatives at the roundtable, Freyer and John Rogerson, director of university networking services at Brigham Young University (BYU) in Provo, Utah, said their key requirements are seamless integration of management tools, application performance monitoring products and network simulation software. The latter topic cropped up when John McConnell, president of McConnell Consulting, Inc. and the roundtable chairman, posed the following series of questions: "Are you able to answer questions like, 'What happens if we're going to add another 500 Lotus Notes users? What's going to happen to our network? What's going to happen to performance?'"

Freyer's reaction was that he can only respond based on his experience and knowledge of the network, not by using any network simulation tools.

In terms of managing applications, he said, "It's important to be able to tell how the application is running while it's running, so you can see things down the road, then make adjustments."

Rogerson said the lack of control over the end-user base is one of his biggest problems. "It's one thing to be in a corporate setting where IS is in control and you don't move an application or a device without their help," he explained. "It's another issue to be in a university setting where we've got 5,000 or 6,000 devices out there and nobody ever asks."

On the vendor side, one objective is to provide a top-down view of the network, where the top is the application, said Wayne Morris, product marketing manager for open systems at BMC Software, Inc. Until now, vendors have been more concerned with element managers that control the various network components — hubs, routers and such. Application vendors historically haven't gotten involved in the management arena.

"So there was some kind of disconnect between the element-level management and how you got to a top-down view," Morris said. "There's a real recognition now that you should. . .start with an application perspective, then drill down into all the layers that you're managing below that."

JIM DECKER

UPS's *Philip Freyer: "It's important to be able to tell how the application is running while it's running, so you can see things down the road, then make adjustments."*

By all accounts, it can't happen too soon: This disconnect is what is giving users fits as they try to figure out if a problem is caused by an application or the underlying network. Freyer said such troubleshooting today amounts to a process of elimination. First you use element management tools to determine whether there is a problem at the network layer or below. If not, you turn to the application folks.

Asheem Chandna, who, until recently, was director of product management for the EcoNet Division of Compuware Corp., a systems management tool vendor, agrees. "We sometimes joke that we're in the blame management business," he says. "Who's going to stay after 5:00? Is it the server or is it the network?"

Web woes

Web technology is only making the problem worse.

"When you start going to Web-based interfaces, you're entering a whole new realm of systems management that is only right now being founded," says Ken Mackin, manager of systems management strategy for Intel Corp.'s Emerging Technologies Group and technical program advisor for the *NW* Managing Enterprise Networks conference. "If you're a client and you're trying to connect to a Web server somewhere and you get an error message 30 seconds later, that Web server had no idea that you tried to connect."

JIM DECKER

BMC Software's *Wayne Morris: "There's a real recognition now that you should start with an application perspective, then drill down into all the layers that you're managing below that."*

And if you do connect, McConnell noted, it is possible, or even likely, that you'll use the services of more than one Web server before you get what you're after. That means there's lots of server-to-server communications happening behind the scenes which, at least in an intranet environment, have to be tracked.

Such environments are also completely unpredictable, further complicating the issue.

When an end user has a problem with a Web-based Internet or intranet application, the net manager may also need to recreate the path the user took to that application, said Ed Arrington, chairman of the Desktop Management Task Force and a product manager at Intel. The manager "needs ways to look at the path that I'm on and a way to track that path and to figure out what's going on," Arrington said.

The solutions

According to Chandna, Compuware has tools that can track the path users take to Web-based resources. "User interest in that particular capability has just exploded in the last six months," he said.

Michael Pierce, marketing manager for application management products at IBM's Tivoli Systems, Inc. subsidiary, said that his company, in conjunction with Sun Microsystems, Inc., has proposed a new standard intended to help address such issues.

BYU's *John Rogerson: "We're*
profit-based, we're more fear-based: 'What's going to happe
us if we don't do this?'"

The Internet Management Specification (IMS) will define a set of standard APIs that will enable Internet-related products to be monitored and controlled from a variety of vendors' management systems. Several vendors, including Bay Networks, Inc., Cisco Systems, Inc., Netscape Communications Corp. and Spyglass, Inc. have announced their intention to support the specification.

Experts in a box

Roundtable participants agree that, in addition to such efforts, it's critical to somehow capture the collective body of knowledge that exists regarding the systems and applications that need to be managed.

"That's why we're working with [application development tool vendors including] Unify, Forte, Dynasty and

Powersoft," Pierce said. Such vendors have endorsed Tivoli's Applications Management Specification (AMS) as a way to let users outfit applications with management hooks that work with a common framework, complete with correlation features.

"AMS allows the people who are developing the applications, the people who know what's critical about those applications, to document and identify the critical components," Pierce said. "It's like the olive branch between applications and operations [personnel]."

Arrington noted the importance of standardizing such efforts given the multivendor nature of enterprise networks. "If each of these vendors don't do things the same, then the problem is going to just magnify," he said.

For its part, he said, the Desktop Management Task Force (DMTF) is working to get its Desktop Management Interface (DMI) implemented on all major operating systems. Microsoft Corp., IBM, Novell, Inc., Sun and The Santa Cruz Operation, Inc. have already pledged support for the latest version, DMI 2.0, which should help management systems gather information from those vendors' operating systems.

Similarly, he said, the DMTF's Management Information Format (MIF) defines a number of ways to manage software, including how to recognize pertinent information. "The whole point is to start from the foundation and build a common, well-understood method for gathering this information regardless of where it comes from," Arrington said.

Seagate Enterprise Management Software is one vendor that would like to see the DMI and various DMTF MIFs — or something like them — succeed.

"We're bending the arms of the application vendors to provide a standard level of instrumentation," said Mark Sutter, vice president and chief technical officer at Seagate. "Any form of API is satisfactory, as long as it provides at least a lowest common denominator of visibility into the behavior of applications and their use of network resources."

This is crucial if Seagate is to realize its goal of building fast reasoning agents and engines that can model applications and their use of network and system resources. The idea, Sutter said, is to collect data on configuration inventory, software metering and usage and make it available to management systems at any level of the enterprise hierarchy.

Playing by the rules

Given all this information flowing in, users will need rules that help them decide what to do. According to BMC's Morris, vendors of packaged applications and systems, such as databases and operating systems, will have to provide such rules with their products.

McConnell agreed. "When all the icons are going red on the screen and people are calling up and they're really upset, do you want that [console operator] to make the decision about what's critical for the business? I don't think you do," he said. Instead, the management system should automatically implement predefined policies, or at least provide the operator with some direction to ensure the most important applications are taken care of first.

Rules also help obviate the need for experts who are well-versed in only one or two areas of the network. "It usually hurts you as an organization when you have that kind of person in your department," UPS' Freyer said.

Another key to preventing application downtime, Chandna said, is to configure the network around your most critical applications.

"We typically see anywhere from 50 to 150 applications on most Fortune 500-type accounts. But it really comes down to maybe just three or four of those that are important," he said. "When you're configuring your network, all you want to be doing is thinking about those two or three applications. Everything else is noise." ■

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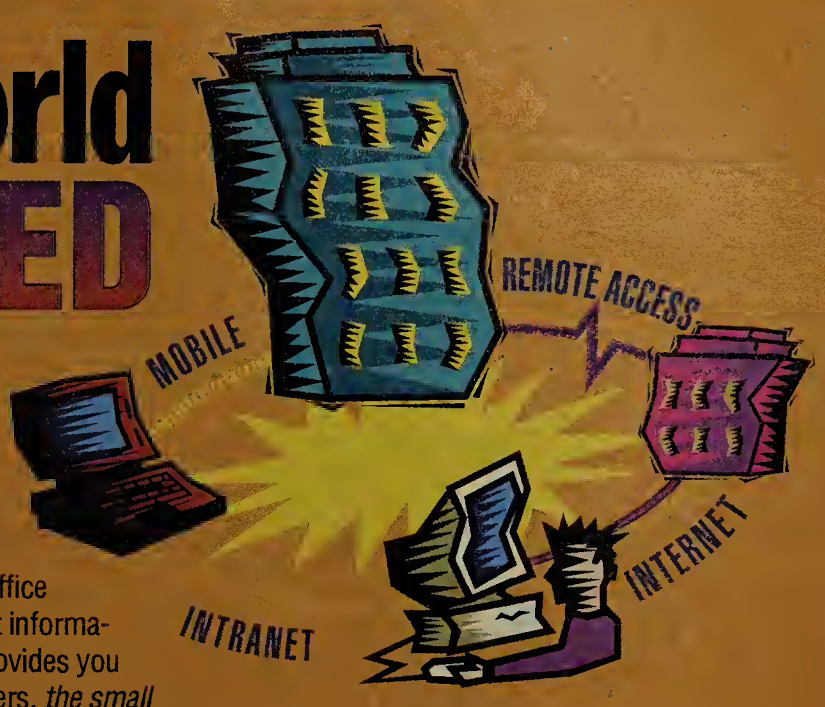

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Briefs

Software House International, Inc. *is sponsoring* **Covering Your Assets,** *a systems management seminar scheduled to run in several cities through July 2.*

Microsoft Corp. and Micropath, Inc. will participate in the half-day sessions. Attendees will learn about inventory management, software distribution, license compliance and tools, and implementation methodology. The seminar is free, but advance registration is required. The host cities for the sessions are Washington, D.C.; Tampa and Orlando, Fla.; New York; Farmington, Conn.; Atlanta; Waltham, Mass.; and Houston.

Software House International: (800) 527-6389.

Cabletron Systems, Inc. *will also be hosting a seminar. Called* **Intranet Essentials: Switching and Virtual Networking,** *it will take place in June.*

Analysts from McConnell Consulting, Inc., Strategic Networks Consulting, Inc. and The Yankee Group as well as Cabletron senior systems engineers will give network managers and engineers an idea of the role that switching and Cabletron's SecureFast Virtual Networking can play in building an intranet. Topics to be covered will include how to hold down operational costs, institute policy-based management and security, and allocate bandwidth.

The free seminar will be held in the following cities: Philadelphia, Washington, D.C., Atlanta, Boston, Chicago, Cincinnati, Denver, San Francisco, Houston and Los Angeles.

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Meanwhile, **Cabletron** *has opened the doors of its* **Worldwide Training Center.** *The state-of-the-art facility in Portsmouth, N.H., will provide training for 16,000 employees and customers a year. Training and educational programs will focus on the use of Cabletron products in enterprise environments.*

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Put more 'ability' into your E-mail RFP

By Joel Snyder

You're ready to whip up a request for proposals (RFP) for an enterprise electronic mail backbone.

About all you hear is that Microsoft Corp. is pushing Exchange as a viable option and Lotus Development Corp. is repositioning Notes as a corporate mail standard, and how these actions have forced vendors of traditional backbone E-mail into a fight to justify their existence.

Key questions for E-mail backbone RFPs

Make sure you structure your RFP so that you get answers to questions concerning these product abilities:

- **Scalability:** Can this backbone handle all your E-mail?
- **Reliability:** Will the backbone reliability match the mission-critical nature of your E-mail?
- **Flexibility:** Are the E-mail systems, directories and special functions that you need currently available?
- **Manageability:** Can you control the backbone at the level you need?

Each of these vendors is pitching its technical implementation as the one that will best suit your needs.

You listen because you know the stakes are considerable. A typical backbone, designed to link existing heterogeneous corporate E-mail systems along with Internet and X.400 mail, starts at around $20,000 but can jump to $100,000 in a flash. An Exchange backbone, in contrast, fits nicely into a $10,000 budget.

To simplify your selection process, try mapping out your needs along the lines of product "ability" — scalability, reliability, flexibility and manageability — and include those requirements with the RFP. This way, you can find out which vendor can really meet your specific needs and whether Exchange is the right choice for your E-mail backbone.

Here's what to consider as you scrutinize each ability:

Scalability

Figure out how big your backbone has to be by estimating the total volume of messages that will move over it. Then make sure the products you have in mind will leave room for expansion. Don't assume that only cross-platform mail — such as sending from cc:Mail to the Internet — will move through the backbone. Instead, count every single message currently moving through your E-mail systems, no matter the source or destination: You never know when a message may cross that backbone or if you'll need to have them all cross it.

Once you have an estimated size, you can get an accurate price quote for hardware, software and integration services. Find out how far you can push that hardware and software before an upgrade is required. You'll also find out how many systems your backbone will need, which will help you project system and network management workload.

Although some sizing problems can be solved by throwing a bigger CPU at the backbone, there are breaking points such as size or geography that will dictate when to move to a multiple-system approach. Just remember that a two-CPU backbone is more than twice as difficult to manage as a single-CPU one because you have to coordinate two systems configurations to maintain relatively tight synchronization.

Reliability

Decide now just how mission critical your E-mail is. If your business will grind to a halt if E-mail does not flow, make this clear to vendors and budget for support costs accordingly. For truly nonstop service, you may have to double your hardware and software costs by running redundant servers.

This is one area where Exchange will struggle to catch up, at least for a few years. With only a few weeks of production operations under its belt and virtually no experience in troubleshooting the most complex of problems, Microsoft does not yet have a reputation for E-mail experience.

Fortunately, most E-mail backbone problems are very source-specific and don't affect the entire network. Beware, though, of high-end limits that any backbone may have, whether it be the total number or size of messages, the number of simultaneous connections, or memory and disk consumption rates.

Flexibility

The major differences in E-mail backbones are the various messaging systems they connect and how much manipulation each message can receive as it moves along. So list the messaging systems you care about up front. Often, the lack of a direct link from backbone to LAN or legacy E-mail systems means you'll be passing through a dysfunctional Simple Mail Transfer Protocol or X.400 gateway with low throughput or a propensity to mangle attachments and addresses.

ONLINE

Get a grip on some of the key budgetary and technical issues in making the move to client/server messaging by jumping onto Network World Fusion. Select Careers then "More on Messaging" and you'll find links to:

- **Our test of Microsoft Exchange**
- **Our "Moving to Client/Server Messaging" special section**
- **An article that explains how adopting best administrative practices in file-based E-mail systems can stave off a move to client/server messaging**
- **An article that provides a financial model for figuring out the cost of moving to client/server messaging**

http://www.nwfusion.com

Think hard about all of the features your backbone will need. Should the backbone rewrite addresses in mail headers? Do you want it to automatically encrypt and decrypt mail to particular trading partners? Can the backbone be part of your security system and work with your firewalls?

Centralized naming and directory synchronization are very popular backbone features, and these are by far the hardest to implement. Again, vendors may claim compatibility when what they really offer is a poor kind of coexistence.

For large directories or those encompassing multiple heterogeneous E-mail systems, insist on a thorough and technical explanation of what the backbone can and cannot do. If you do use centralized naming, your backbone should be able to use the Lightweight Directory Access Protocol (LDAP) to connect and synchronize with a corporate directory, such as one that uses X.500.

The best approach to determining how much flexibility will suffice is to list the top 10 services and features you need. Then, make sure that each backbone you're considering has every one of them and that they are well implemented.

Manageability

Monitoring, controlling and logging E-mail as it passes over the backbone are more crucial the larger your network gets. The more mail passing through a system, the greater the need to have a large number of buttons, knobs, dials and controls for managing it.

If your company does business with the government or you work in government, your backbone should be able to "snapshot" all messages passing through it, even if you are not currently required to do so.

Some high-end E-mail backbones come with graphical user interface-based management systems. These are nice, but make sure there's substance underneath the flash. You should be able to see what mail is moving through the backbone, turn it on or off, and get an alarm when mail is backing up.

The bottom line here is that you really need to think about exactly what you want and make those requirements clear in the RFP. In your analysis of these RFPs, insist on detailed technical information, demonstrations and conversations with managers at sites similar to yours.

Snyder is a senior partner at Opus One in Tucson, Ariz. He can be reached at jms@opus1.com.

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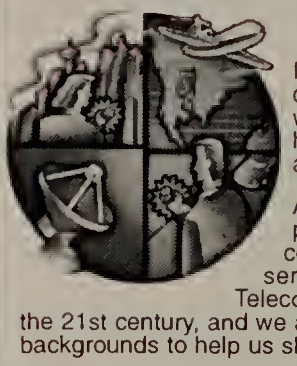

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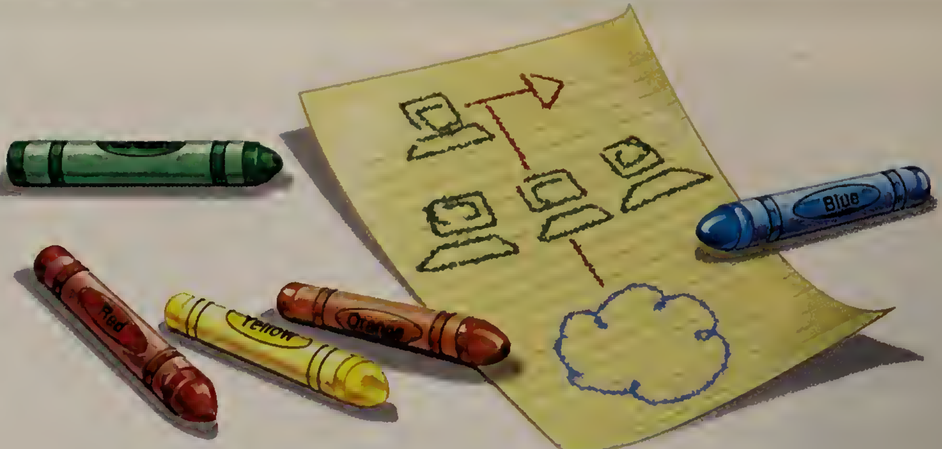

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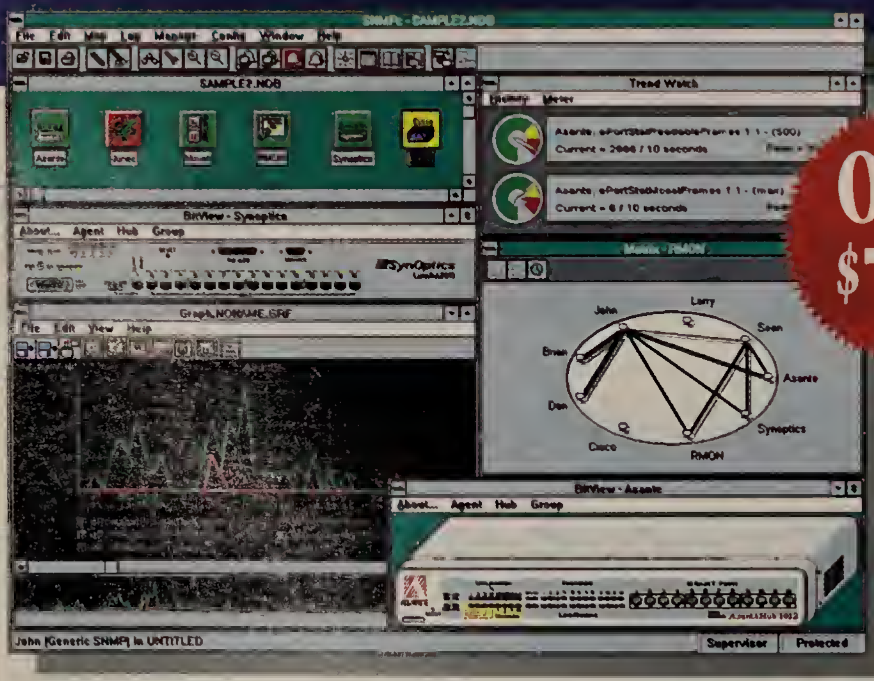

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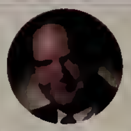

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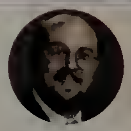

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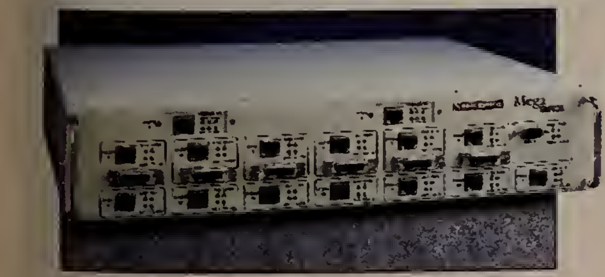

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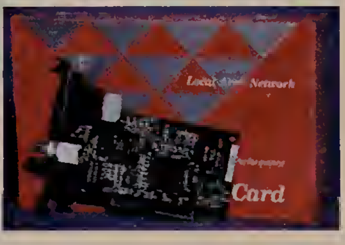

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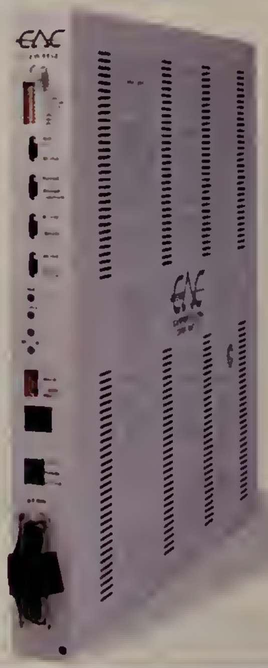

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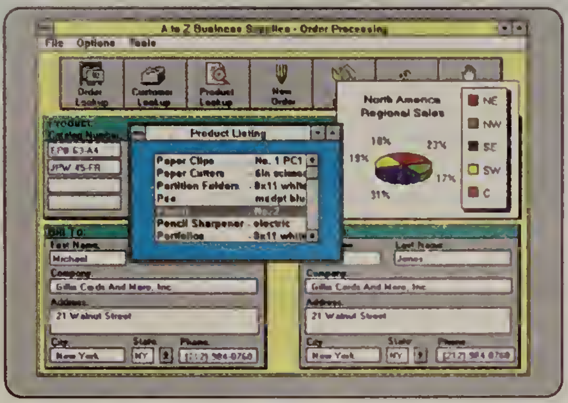
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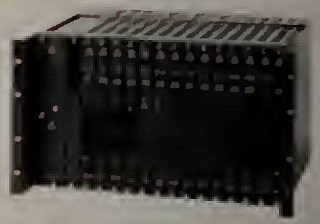

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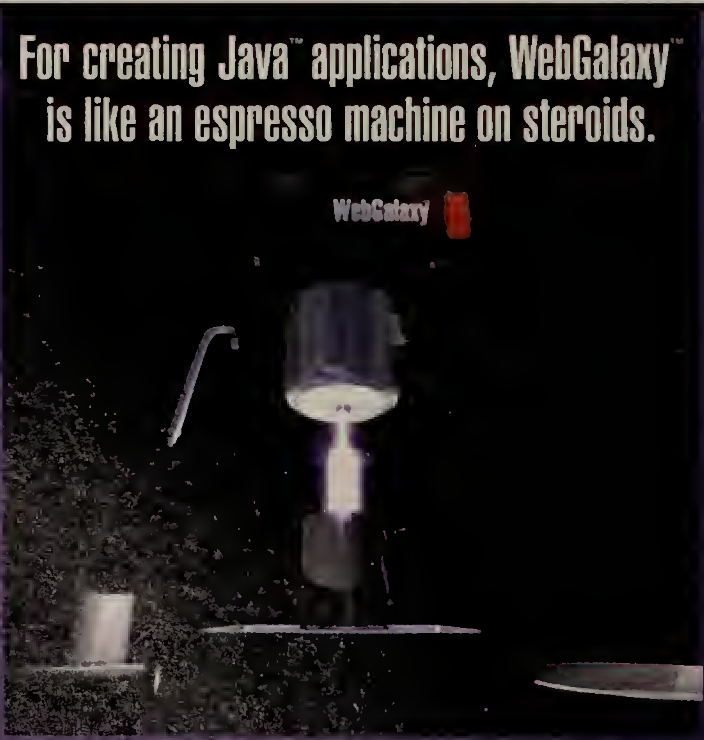

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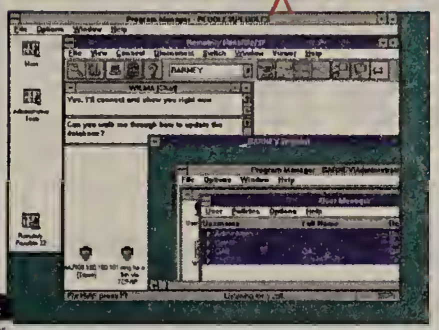

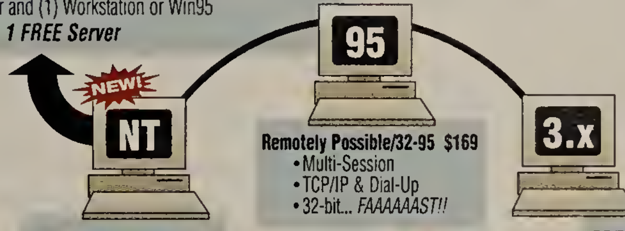

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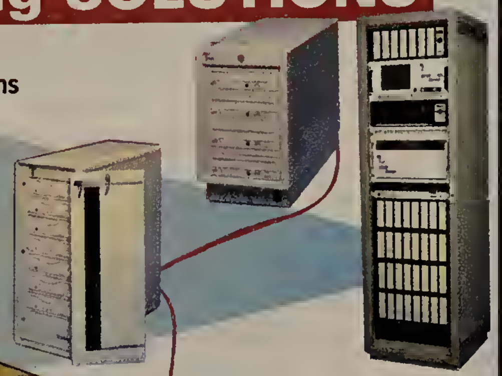

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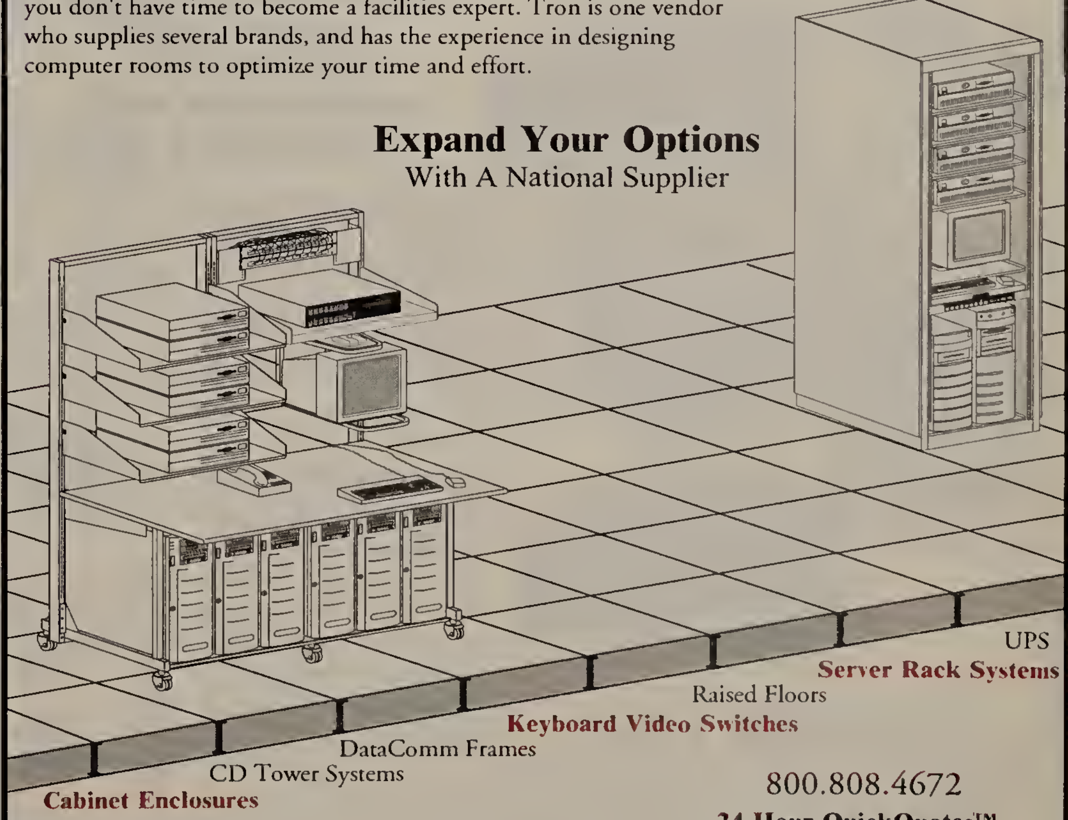

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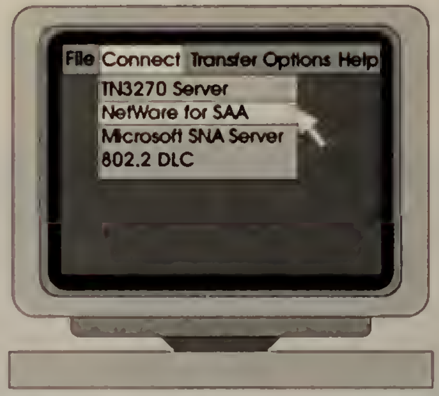

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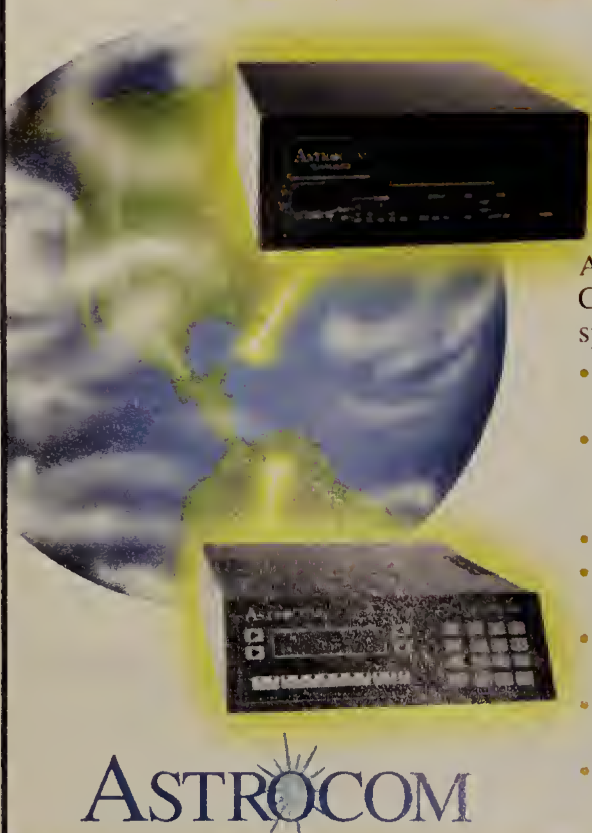

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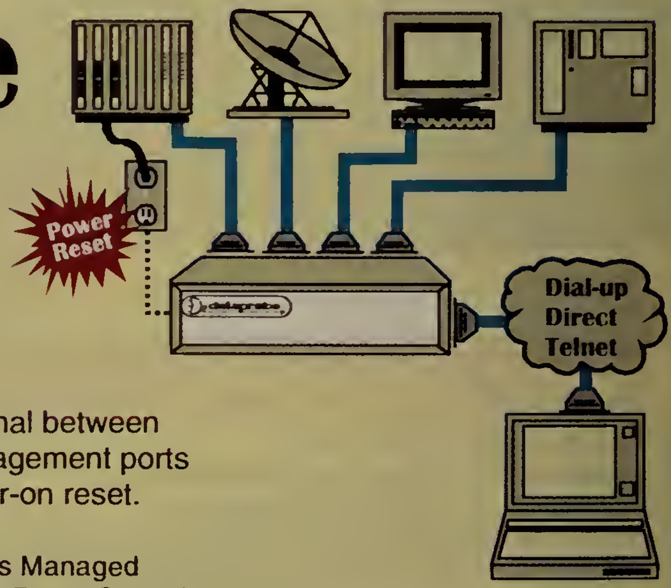

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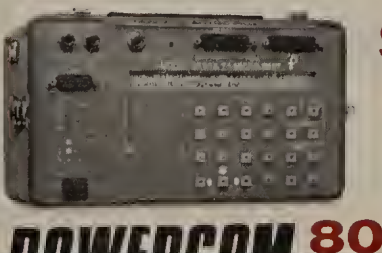

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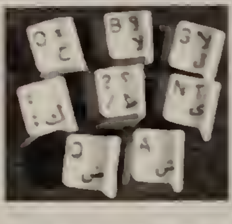

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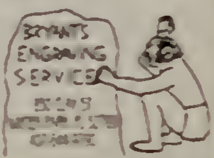

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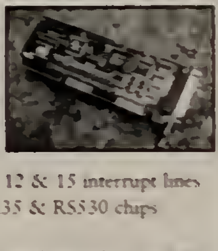

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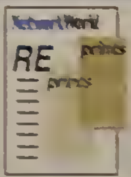

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Cisco

Continued from page 1

across switched networks and for use in Internet service provider networks. Cisco declined to comment for this story, but said a product announcement is scheduled for June 10.

The modular 7200 chassis come in two basic models: the four-slot 7204 and the six-slot 7206. The new line sports backplane speeds of up to 600M bit/sec and a 150-MHz RISC processor that can switch 140,000 packet/sec. It supports the full suite of Cisco Internetwork Operating System routing sotware, including NetFlow switching for connection-oriented routing (*NW,* Apr. 22, page 17).

The 7200 can house as many as 48 Ethernet, 24 serial and 24 token-ring ports. Pricing starts at $4,000 for the 7204 chassis.

On the other hand, Cisco's high-end 7000 line has a 533M bit/sec bus, a 25-MHz 68040 CPU that can switch 110,000 packet/sec, and support for 30 Ethernet, 40 serial and 20 token-ring ports. Pricing starts at $6,900 for the five-slot 7010, and only three slots can be used for network interfaces.

While the 7200 routers are flexible and priced aggressively, their uses may be limited by a lack of certain interface modules. For example, there is no mention in the 7200 documents of support for the IBM Channel Interface Processor (CIP), although Cisco is positioning the routers to handle campus and regional office Data Link Switching and IBM Advanced Peer-to-Peer Networking traffic.

The 7000, meanwhile, supports the IBM CIP, which enables it to displace a gateway or front-end processor for linking IP networks to SNA subareas.

But the 7200, unlike the 7000, has been designed with emerging VLANs in mind. The 7200 features an embedded Fast Ethernet port that can link the router to Cisco's Catalyst LAN switches to provide Layer 3 routing in high-volume switched LAN environments. This would be more cost-effective than purchasing Cisco's top-of-the-line 7500 router, which starts at $10,900, according to the documents.

This application hits home with some users.

"What I want to see Cisco come out with is a really nice high-speed route processor that calculates routes for Catalyst 5000s and make it real inexpensive," said Allen Robel, senior network analyst for the computer services department at Indiana University in Bloomington. "I don't care if it has one port on it."

Another application for the 7200 is Internet and WAN access. With support for as many as 24 serial ports, the new router provides high-density Internet and corporate net access for remote sites, and cost-effective routing and frame relay concentration for service providers.

Moreover, the 7200 will support a new port adapter that allows users to selectively encrypt applications for safe transport across the Internet. This is less expensive than encrypting all traffic on each link. The 7200s will be manageable via Web browsers using a new HTML-based monitoring and configuration tool. The 7200 also sports a dual power supply option.

On the competitive front, the 7200 appears to go up against 3Com Corp.'s four- and eight-slot NetBuilder II, which supports as many as 48 LANs and 24 WAN links. The four-port chassis costs $2,995; the eight-port chassis costs $5,495.

©Cisco: (408) 526-4000.

A broad Cisco selection

Product	Price
7204 4-slot router chassis	$4,000- $4,500*
7206 6-slot router chassis	$5,000- $5,500*
150-MHz Network Processing Engine	$5,000
8-port 10Base-T module	$8,000
4-port 10Base-T module	$4,500
5-port 10Base-FL module	$8,000
1-port Fast Ethernet (copper)	$4,000
1-port Fast Ethernet (fiber)	$4,700
4-port token-ring module	$10,000
4-port serial interface module	$5,000
1-port FDDI module	$10,000- $15,000

All products available this month, except for the 7206 chassis with DC power and the 7204 chassis. They will be available in the third quarter.

*Software options add another $2,000 -$12,500.

Switch

Continued from page 1

switches and modules. Taken together, these products will make switched technology more available and cost-effective.

3Com's plans are the most far-reaching. The vendor will not only tackle Ethernet switching, but also widen its switch families and attempt to provide users with a migration road map. 3Com acknowledged the announcement but declined to comment on product specifics.

Some explaining to do

The company has, at times, been criticized for not having a clear migration path between its Cellplex Asynchronous Transfer Mode, LANplex local area and ONcore intelligent hub product lines.

According to sources, the company will roll out Fast Ethernet switch modules for the LANplex and ONcore models. This should allow users to more easily build Ethernet switching into their backbone networks. The modules are due by year-end.

ONcore is also due to pick up Remote Monitoring support to ease manageability. In addition, the company is expected to detail when a token-ring switching module will be available. And the ONcore box is due to pick up some of the LAN and other switching features offered in 3Com's Transcend Virtual Networking technology.

For its LANplex box, 3Com will add support for FDDI and Fast Ethernet as well as an ATM module that conforms to User-Network Interface 3.0. The module will support LAN emulation and IP over ATM.

"3Com is retrofitting ONcore with its own technology in an effort to make it more compatible with its other products," said John Morency, a principal with The Registry global information services company in Newton, Mass.

Don't fight the switch

Across the country, HP will make its initial foray into the Ethernet switching market with the AdvanceStack Switch 100 and DeskDirect 10/100TX PCI LAN adapter for workstations. The company is also packaging the switch with its Interconnect Manager for Windows software for use on its NetServer line of workgroup servers.

The AdvanceStack Switch is being positioned as a small store-and-forward workgroup switch capable of supporting 16 10Base-T ports and one 100Base-T uplink to a server or larger switch. The HP DeskDirect 10/100TX adapter includes support for Novell, Inc. NetWare; Microsoft Corp. Windows 95, NT and Windows for Workgroups; Banyan Systems, Inc. VINES and other leading desktop systems. Users can set the adapter to support 10M or 100M bit/sec Ethernet links.

IBM is looking to boost its stature in the workgroup switching market by integrating its 8271 Ethernet and 8272 Token Ring switches with the 8260 Nways Multiprotocol Switching Hub. Currently, the 8271 and 8272 are stand-alone workgroup switches.

Robots at work

Finally, over at U.S. Robotics, the company is introducing its TotalSwitch Ethernet Switching Hub, a modular Ethernet switch capable of supporting two to 32 ports. It can utilize 10Base-T, 10Base-FX and other 10Base standard media types that can be mixed in any combination on the switch. A two-port 100Base-T card is also available for the box. ■

A-switching we will go . . .

Company	Product	Price	Availability
3Com	**Oncore family**		
	100Base-Tmodule	NA	Q4
	7-port Fast Ethernet module	NA	Q4
	12-port shared 100Base-T	NA	Q4
	24-port 10Base-T module	NA	Q4
	RMON agent support	NA	Q4
	LANplex family		
	2-port FDDI switch module	NA	Q4
	8-port Fast Ethernet switch module	NA	Q4
	6-port Fast Ethernet module	NA	Q4
	24-port 10Base-T module	NA	Q4
	1-port 155M bit/sec ATM UNI module	NA	Q4
HP	AdvanceStack 100Base-T Switch	$3,399	Now
	Server Performance Pack	$3,499	July
	10/100VG PCI Adapter	$169	July
	10/100TX PCI Adapter	$169	July
IBM	8271 Ethernet LAN switch module	$7,950	Oct.
	8270 Token Ring switch module	$8,650	Now
U.S. Robotics	TotalSwitch Ethernet Switching Hub	$1,995	June
	TotalSwitch 100Base-T card	$1,895	June

NA = Not available

Message queue

Continued from page 37

The page 1 portion of the story clearly spells out the alliance's objectives, as does an infographic and other portions of the story on the jump page.

The quoted sources were not alone in raising questions about the alliance's motivation: In its analysis, Dataquest, Inc. described the move as "a thinly veiled attacked against [a] common enemy — Cisco." We were simply reporting an oft-cited reaction to the news.

As for the more specific issues raised by CEO Benhamou: The use of the word "standards" seems to be a matter of semantics. While the NIA is not a true standards body, it will be attempting to establish a common — or standard — approach to building interoperable high-speed networks. The article accurately states that other network vendors were not being excluded from the group, nor were they specifically invited to join it.

We did not interview anyone from 3Com prior to publication; however, our reporters spoke to an IBM representative and had access to materia from the NIA members. It is also tru that Network World *did not atten the alliance briefing. All editoria staff members were gathered in biannual strategy meeting on Monday, May 20.*

Regarding the market share dat on the router market: We stand by ou findings. According to a recent repor from Dataquest, Cisco held a 71% share of the backbone router market based on revenue.

We stand corrected on the mark share figure for switches. Based on recent Yankee Group report, Cisc held only a 34% share of the wor group switch market, not 50% as reported.

Unlike the rollout of a produc our coverage of the NIA is not a on time event. We will continue to cov this group as it works to achieve i goals.

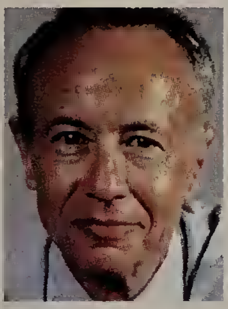
Intel puts video into motion over regular phone lines

By Ben Heskett

New York

Intel Corp. last week announced a desktop videoconferencing system that works with existing modems and runs over standard phone lines.

The Pro Share VideoPhone system extends Intel's desktop video product line, which already includes products for conducting conferences across ISDN lines and LANs.



Grove *says Intel will make use of current video technologies.*

The desktop videoconferencing market has been slow to take off due to telecommunications bandwidth limitations, according to Andy Grove, Intel's president and chief executive officer, speaking at a press and analyst conference here last week. Intel's goal is to offer video products using current technologies while bandwidth issues get ironed out, he said.

The new software runs on desktop computers based on a 133-MHz Pentium processor or more powerful chip. The PC must also be equipped with a camera, which costs about $200.

While the product has several things going for it, the video quality is less than ideal. Images move in a stunted fashion at about 10 frame/sec as compared to full-motion video seen on television, which moves at 30 frame/sec.

Still, Intel has received an early endorsement from Compaq Computer Corp., which plans to include Pro Share VideoPhone technology in some of its PCs by this fall.

In addition to the new video tool, Intel previewed three other initiatives:

- A customized chat software package code-named Clubhouse that will allow users to create their own interactive discussion groups and let others find the groups via a directory.
- Intercast, a multimedia application that combines Web browsing with television viewing. The technology will let people search for more information on their PCs by calling up Web pages updated by the television networks. The offering will be available this summer.
- A help desk feature for its LANDesk management suite, which will allow users to send trouble-ticket information via the World-Wide Web to an internal help desk or third-party customer support company. ■

Nortel

Continued from page 1

Before the Meridian Passports were installed last month — taking intercampus PBX and LAN traffic and chopping it up into 53-byte ATM cells for transmission across T-1 links — data was carried over three 64K bit/sec channels reserved on the T-1s.

Leasing another T-1 to add more data bandwidth would have cost $8,000 per month at Canada's T-1 prices, according to McGill's Bernstein.

Although the university is a beta tester of the ATM modules and has not yet bought them, if it were to buy them at list price, the payback by avoiding the extra T-1 would be about two years, Bernstein said.

Passport represents an interim solution as users migrate toward ATM wide-area nets and begin to integrate PBX traffic, according to Howard Kline, an analyst for Gartner Group, Inc. in Stamford, Conn.

Eventually, servers will take on the application aspects of PBXs, such as automatic call distribution, and call switching will be handled by ATM enterprise switches, Kline predicted.

In the meantime, interfacing existing PBXs with ATM switches is a viable alternative — the same model Lucent Technologies, Inc. follows with its Definity Enterprise Communications Server. For users who want to tie the Definity into an ATM network, Lucent will resell an ADC Kentrox AAC-1 ATM access concentrator, which sits between the Definity and an ATM switch. The Meridian Passport is an eight-slot chassis that sits atop the Meridian PBX and is connected via T-1 interfaces.

The list price starts at about $50,000 for the chassis, two power cards, a controller, a V.35 card for data traffic, two DS-1 PBX interface cards, and a four-port DS-1 card for WAN interfacing.

An ATM LAN interface is scheduled for later this year.

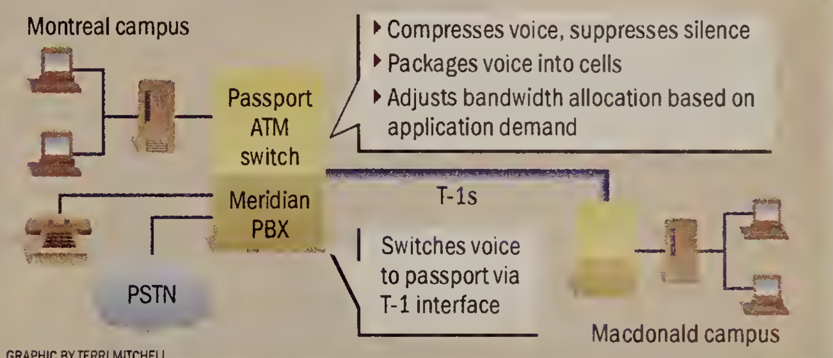
General availability of the Meridian Passport is scheduled for the fourth quarter.

The Meridian Passport would be managed by the Meridian network management system, but in partnership with Cabletron Systems, Inc., Nortel is working to make it manageable through Cabletron's Spectrum management system.

When configuring the device, users set a priority for each application, establishing service levels for each. So time-sensitive traffic, such as voice and video, would be given top priority. Bandwidth for lower priority traffic such as electronic mail would be ratcheted back during a high-bandwidth burst of video and voice. ■

Squeezing out extra bandwidth

McGill University has increased available data bandwidth eightfold between its Montreal and Macdonald campuses, using a combination of Nortel's Passport ATM switch and Meridian PBX. Together, the devices have squeezed voice traffic onto fewer channels, while dynamically allocating bandwidth for data applications.


Montreal campus
Passport ATM switch
Meridian PBX
PSTN
Compresses voice, suppresses silence
Packages voice into cells
Adjusts bandwidth allocation based on application demand
T-1s
Switches voice to passport via T-1 interface
Macdonald campus

GRAPHIC BY TERRI MITCHELL

Microsoft

Continued from page 1

tory will also be supported by makers of software that add value to these Microsoft development environments, Roskill said.

But don't expect competitors in the development tools market to support the technology, at least initially. While Microsoft promised an "Open Process Design Review" by the fall of 1994, it has not yet taken place, conceded Microsoft and TI officials.

"Two years ago, people were expecting them to make the spec available, get their feedback, and do the development," said Mike Blechar, program director of application development tools and technologies for the Gartner Group in Stamford, Conn. Instead, TI and Microsoft went it alone. "They changed their plans, but they didn't tell anybody," he said.

Even with the delay, Microsoft has a huge head start: It is already modifying its tools to support the repository and its competitors aren't. "We are not going to try to position the first delivery as an open industry standard. The first version will be adding value to Microsoft tools, period," Roskill said.

TI Software, which has received kudos for its development of the Composer repository product, also delivered a specification dealing with catalog objects and components late last year, said Bob McLendon, president of TI Software. Under the deal, Microsoft is using the specification as the basis of the software it is writing.

The client-oriented technology expected to appear in Visual C++-like products later this year will be largely aimed at cataloging, and will work on top of the Microsoft SourceSafe version control tool, rather than as a robust, database-oriented repository.

A catalog is a subset of a repository, which simply tracks the location and some attributes of software components. A full repository is much more database-oriented, keeping track of more types of components, and offers sophisticated ways of sharing these objects during the development process.

One key shortcoming of Microsoft's initial version will be a lack of scalability, Roskill said. Also lacking will be version control, inheritance, and full life cycle integration.

"It is not going to be very robust," Blechar said.

Next year, Microsoft will begin to roll out a more distributed product, a repository that will let users track and manage an array of objects on a server, including Active X objects, spreadsheets, specifications, help files and Gantt charts. Ultimately, though, Microsoft hopes to make multiple servers appear as one.

"Down the road, there might be multiple physical databases, but they will work together as a single entity. It will take advantage of a directory services layer, really a virtual mapping of separate repository databases," Roskill explained. "If you ask for a component, the database knows where to go."

Microsoft is not alone in finding repository development tough sledding. After years of trying, IBM failed in its attempt to make its AD/Cycle tool (now called IBM Repository/MVS) an industry standard.

Despite the slow start, Blechar predicts that "within three years [Microsoft's] will probably be the dominant repository technology in the market." ■

A CHANGE IN PLANS

Then . . .

"Both companies are committed to providing open industry solutions that can create additional opportunities for independent software vendors."

— *From a May 1994 joint Texas Instruments/Microsoft press release*

Now . . .

"We are not going to try to position the first delivery as an open industry standard. The first version will be adding value to Microsoft tools, period."

— *Jon Roskill, Microsoft group product management in the internet platform and tools division*

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Second-class postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385662. *Network World* (ISSN 0887-7661) is published weekly, except for a single combined issue for the last week in December and the first week in January by *Network World*, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

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Give me privacy or give me death by governmental abuse

OK. I give in. If you read my column "How Safe Do You Want to Be?" of April 1 and the follow-up column of May 6, you'll remember that I was suggesting we apply IT to make our society safer.

Those columns generated a remarkable amount of mail, most of which took me to task for even having the merest hint of a thought of an inclination toward the possibility of the idea of assuming that the U.S. government can be trusted to appropriately use vehicle movement records. So I've changed my mind. I recant, rescind and otherwise take it back.

Apparently, we (the computer business) can't conceive of a system that would allow us to do something as simple as tracking vehicles while making it even vaguely immune from misuse by the FBI, the CIA and, so it would seem from the more inflamed missives, Mrs. Field's Cookies.

I did receive several messages of support, but I can only assume from the general response that those in favor of the idea are as deluded as I apparently am.

Now, it is a pretty sobering idea that the government is that out of control, that unreliable and that uninterested in upholding the Constitution.

So, let's take this to the other extreme: Let's use IT to ensure the greatest degree of privacy possible. Now this will have interesting consequences for my previous proposal. Indeed, if our privacy is going to become truly profound, we will have to face the fact that criminals will be much harder to find.

And think of the other consequences. For one, it will be much harder to get credit (a bad thing if your business relies on credit driving sales, a good thing for controlling inflation), because TRW and Equifax would be severely constrained in what they could do.

Actually, I rather like this idea. While those companies are there to perform a necessary service, the level of inaccuracies in their data is staggering. (Have you checked your credit history recently? Just write the credit bureaus and see what your report looks like. You may well be shocked.)

It is a pretty sobering idea that the government is that uninterested in upholding the Constitution.

Another downside would be that just about everything would take longer. Any application or agreement you made for any purpose that was legally significant would become much more complex to ensure privacy. Just getting a new driver's license could require days of waiting in line and vast expense.

On the upside: in-depth privacy and, to a great extent, anonymity. If the privacy was total, tax avoidance would be so easy, no one would pay. (Actually, I've heard that there is doubt as to whether we are legally required to pay taxes — anyone have an informed opinion on this? However, I digress. . .) And just think how constrained Ms. Reno would be . . . now there's a fine idea. I think if Slick Willy gets re-elected (which looks all too likely given the alternatives) she is going to be one of the first to get shown the door. And not a moment too soon. But again, I digress.

Could a completely private society be built? Would it be safe or dangerous?

I believe that we could only go a small way toward real privacy and I think it would be dangerous. But hey, if the government is as crazy as you're telling me, perhaps we'd all be a lot safer.

(By the way, I'm hugely disappointed that so few people have taken me up on my offer to see the joke that my editor, The Slasher, cut from a recent column. Come on, guys, I need something to go back to him with. Otherwise, he'll assume he was right. Give me an opinion about the joke by dropping a note to cutjoke.JokeServ@gibbs.com.)

This week, my Internet seminar tour is taking me far and wide — the latter may well be the result of hotel food. Drop a note with your favorite diet to mgibbs@gibbs.com or call me at (800) 622-1108, Ext. 504.

PacBell's 'Net mating dance could yield short marriages

Most of us do not frequent rarefied societal functions like debutante balls. These events allow proud parents to formally introduce a daughter into adulthood. But debuts also have a hidden agenda.

Remember debut party scenes in the movies? Father dances with daughter. She glimpses a cute guy. Both fall instantly in love, etc. The movies got it right: A debut is merely a high-toned mating ritual. Parents try to trick single guys into thinking the debutante is a rich catch. A wealthy guy is a premium, but parents often are happy just to get the girl hitched.

Pacific Bell last week held its own debut party, proud to be the first Baby Bell to offer widespread Internet access. The attractions are its $19.95-per-month unlimited access price and promise of quality service.

PacBell's debut seems straightforward. The large phone company wants to break into a hot new market as an Internet service provider (ISP).

PacBell hopes its new service will make Internet users fall in love at first sight.

According to a recent study by The Maloff Company, annualized ISP revenue was $720 million in April. Add revenue from information service providers such as America Online (AOL) and CompuServe and that number grows to $1.9 billion.

PacBell said about 40% of Internet traffic either originates or terminates in California. No wonder the company wants a chunk of that dowry.

As a new regional ISP, PacBell certainly arrives as a well-heeled competitor. The company plans a huge advertising campaign. The service can support ubiquitous dial-up speeds of 28.8K bit/sec. ISDN access will be available this month. And though the service launch was twice delayed due to technical problems, PacBell said its Internet customers will enjoy the same earthquake-tolerant reliability as its voice customers, and pledged a busy-signal rate of less than 1%.

PacBell hopes its new service will make Internet users fall in love at first sight. But executives at its press briefing admitted the tryst could quickly fail. PacBell's big challenge includes getting and keeping consumers online.

Seasoned ISPs and information service providers have learned this firsthand. Only AOL, for instance, knows the AOL customer churn rate. But the stack of AOL diskettes I receive each month makes me suspect this number is not low.

PacBell hopes to keep its Internet customers by selling them AOL at a discount. But retaining them will require more than scintillating content. Guaranteeing system performance would be a step in the right direction, but that is a complicated proposition.

For instance, imagine this likely dialogue between a crack PacBell support technician and a user:

User: Why is everything so slow?

PacBell: Well, that depends. Our network shows lots of excess capacity. Maybe your Web site is overloaded.

User: Beats me. My television doesn't slow down during the Super Bowl.

PacBell: Unfortunately, it's more complicated than that. Perhaps your client PC is slow or is running too many applications or needs more memory.

User: Hey, wait a minute! The guy at the computer store told me this rig could handle anything!

I think you get the idea. PacBell's intention to provide a "premium Internet experience" for customers is good. But as it will learn, promising quality system performance to fickle 'Net customers may tarnish its image.

Simply put, guaranteeing any reasonable level of Internet service quality is tough because no one entity controls every system element.

Meanwhile, the millions of new customers that large ISPs will certainly attract is bound to dramatically slow the already flaky Internet backbone.

PacBell competitors must be nervous about this giant's entry into the Internet market. On the other hand, they know that smaller providers will probably get a second chance at the ring. After all, who hasn't married the wrong person at least once in their life?

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.

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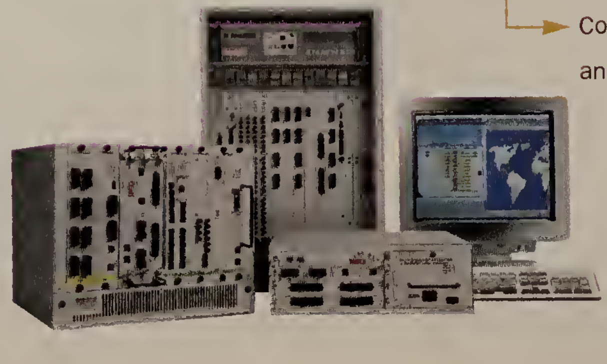

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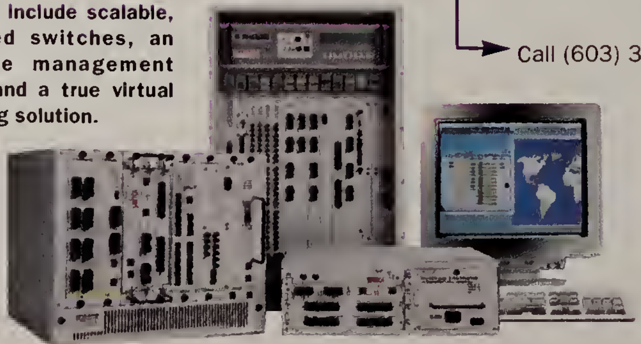

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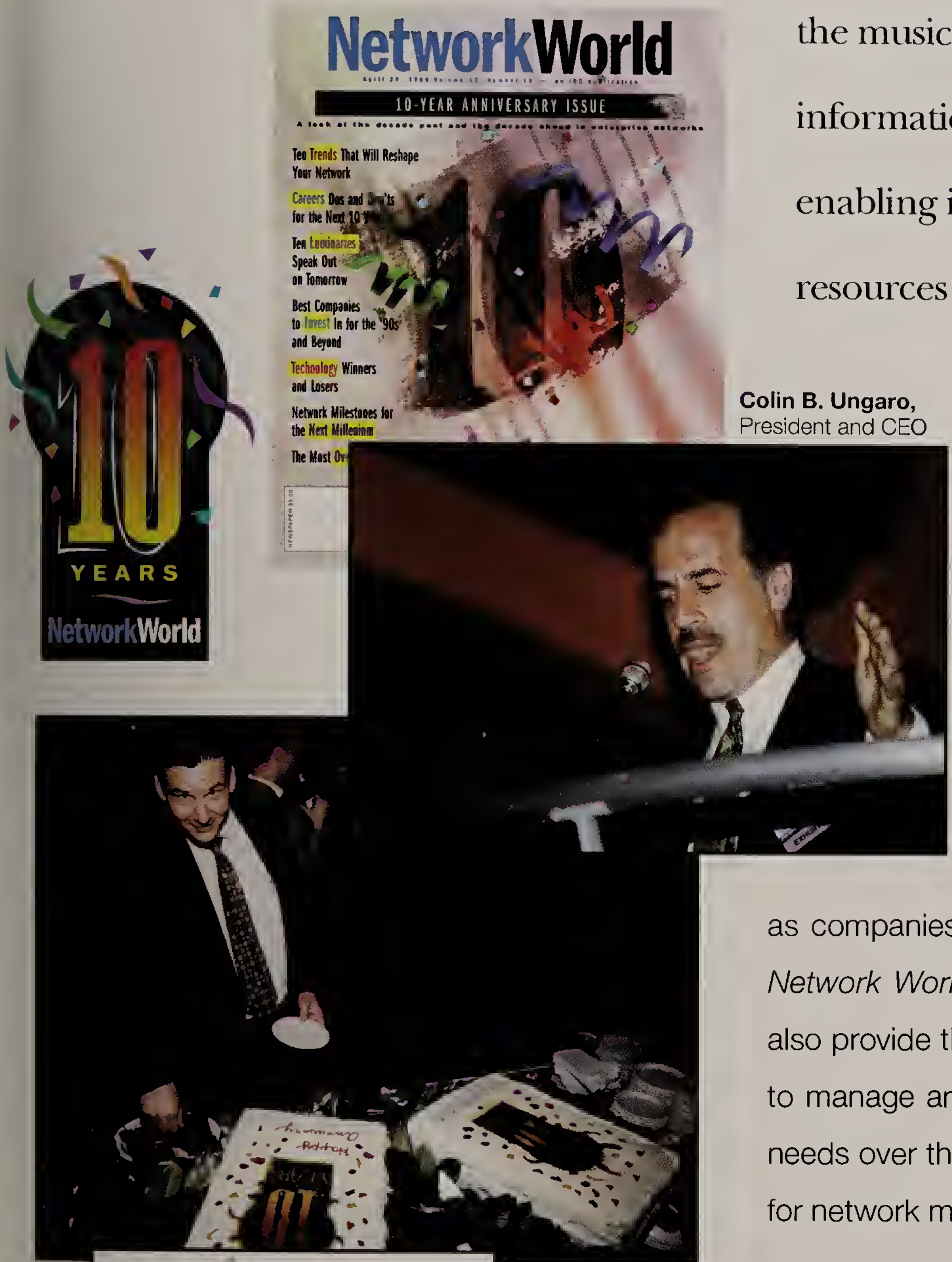
Celebrating a Decade of Networking.

It was 1986. Miami Vice was the talk of TV. Madonna was at the top of the music charts. And *Network World* was quietly launched to serve the information needs of a new breed of professionals charged with enabling individuals to share documents and expensive hardware resources — the very first "network managers."


NetworkWorld
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A look at the decade past and the decade ahead in enterprise networks
Ten Trends That Will Reshape Your Network
Careers Dos and Don'ts for the Next 10
Ten Luminaries Speak Out on Tomorrow
Best Companies to Invest In for the '90s and Beyond
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Network Milestones for the Next Millenium
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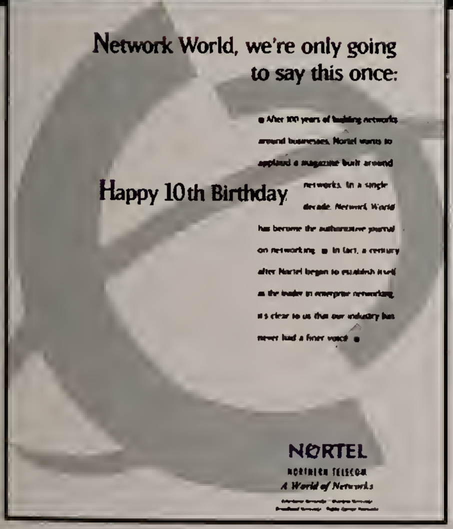
10
YEARS
NetworkWorld

Colin B. Ungaro,
President and CEO

How far we've come! Pick up a newspaper, tune in your radio or turn on the television and you'll find the network has taken center stage. No longer is the network simply a way to share documents and hardware resources. Today the network is the lifeblood of corporate America.

Network World has evolved along with network technology and the role of the network manager. In the beginning, the publication covered the physical infrastructure as network managers struggled to get the technology installed. Today, *Network World* has a much broader focus as companies look for ways to leverage the infrastructure now in place. Not only does *Network World* advise Network IS professionals on how to build the network, but we also provide them with valuable information on how to apply the network as well as how to manage an IS staff and new technologies. We have kept close tabs on our readers' needs over the past ten years to ensure we remain the best source of news and analysis for network managers.

Dedicated to our mission to be the best source of information for the industry, we expanded and enhanced the *Network World* brand. Today *Network World* is a full-service product offering that enables us to bring readers and advertisers — buyers and sellers — together in many new and exciting ways. In addition to our weekly publication, we provide the industry with Technical Seminars; *Network World* Fusion, our innovative online service; NetDraw network diagramming software; and trade show events including *Network World's* Managing Enterprise Networks and *Network World* Unplugged.



Network World, we're only going to say this once:

Happy 10th Birthday

■ After 100 years of building networks around businesses, Nortel wants to applaud a magazine built around networks. In a single decade, Network World has become the authoritative journal on networking. ■ In fact, a century after Nortel began to establish itself as the leader in enterprise networking, it's clear to us that our industry has never had a finer voice. ■

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Thank you to all of our readers and advertisers for making *Network World* a part of your networked world.

NEWSPAPER

100

Access *Network World* Fusion using the number in yellow. See page 5 for details

A Gala Celebration

Network World kicked off its 10-Year Anniversary with a celebration at Steven Spielberg's restaurant "The Dive!". The party took place during NetWorld+Interop in Las Vegas this past April. More than 700 guests gathered to help *Network World* celebrate its anniversary.

The atmosphere was fun, relaxed and casual. Guests could check out the Las Vegas sites using the periscopes accessible inside the restaurant, get a glimpse of their future with a reading from one of the fortune tellers at the party, or just sit back and eat, drink and be merry. It was the perfect opportunity for guests to meet *Network World's* Ambassadors and many of the *Network World* editors who mingled in the party crowd. We hope you'll join us at the Georgian Terrace during NetWorld+Interop in September to help us wrap up our 10-year celebration!

Hats off to our 10-Year Veterans.

In an industry and an era where staff turnover is not uncommon, *Network World* is proud to acknowledge its twelve 10-year veterans. The following staff members have been with *Network World* since the beginning and are still going strong 10 years later:

Top l. to r. *John Dix, Joan Pinsky, John Gallant, Jim Brown, Richard Priante;* ***Bottom l. to r.*** *Mary Rinaldo, Donna Pomponi and Mary Fanning.*

Mary Rinaldo, Telecom Specialist
Donna Pomponi
Senior District Manager
Mary Fanning, Vice President Finance and Operations
John Dix, Editor
Joan Pinsky, Director/Direct Response Advertising
John Gallant, Senior Vice President/Editor in Chief
Jim Brown, Managing Editor
Richard Priante, Director of Circulation
Cheryl Crivello, Assistant to the Editor in Chief
Ann Finn, Director of Production
Pam Valentinas, Director of Recruitment Advertising
Karen Wallace, Manager of Advertising Operations

Congratulations on your 10 years of dedicated service!

NetworkWorld Timeline

1986

Issue debuts March 24.

1987

Gary Beach, now president of *Computerworld,* joins IDG as *Network World's* publisher.

John Gallant
Senior Vice President/ Editor in Chief

1988

John Gallant is promoted to editor.

1989

- Trademarks the term "enterprise network".
- Becomes official sponsor of Interop.

Colin B. Ungaro
President and CEO

1991

- Colin Ungaro is named president/CEO.
- Offers electronic bulletin board system for network managers.
- Becomes official co-sponsor of ComNet.

1992

- Technical Seminars is launched.
- *Network World* and IDC launch first annual *Network World* 500 Study.
- Releases NetDraw clip art.

NetworkWorld Technical Seminars

NetDraw Plus!

1995

- Adscope reports *Network World* leads networking publications with the largest number of ad pages.
- Launch of *Network World* Fusion on the Internet.

Evilee Thibeault
Senior Vice President/ Publisher

1996

- Announces national server test center with *PC World.*
- Evilee Thibeault is named publisher.
- Announces industry's first *IntraNet Magazine.*
- Announces *Network World* Global Product Support Center.

IntraNet magazine
Hatching your intranet plan
IntraView: Novell's Vic Langford
Lock Down! Securing your vital data

Don't miss the debut of *IntraNet Magazine!* See inside back cover of this wrap for details.

A Look Ahead.

Mark Ascolese
Senior Vice President
Exide Electronics Group, Inc.

Accessible, reliable information is growing in strategic importance to businesses worldwide. Sophisticated high speed processors, vast information networks, and a growing intolerance for systems downtime are producing new demands for the availability and manageability of high quality power. Businesses of tomorrow will be purchasing more than hardware and software, they will be purchasing enterprise-wide network reliability.